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Designing a legal service infrastructure where rules make sense again

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The Law, the Map and the Citizen

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For my father: Dad, It is done.
Samenvatting

Inleiding

Het recht is de basis voor de Nederlandse samenleving. Het stelsel van regels is ook complex, moeilijk te doorzoeken en voor niet-ingewijden nog lastiger om toe te passen op een specifieke situatie. Onze overheid onderkent dit probleem door het ‘een labyrint’ te noemen. Men ontplooiit initiatieven als [www.antwoordvoorbedrijven.nl](http://www.antwoordvoorbedrijven.nl) om de dienstverlening te vergroten. Daarnaast wordt het probleem van het moeizame gebruik van het recht opgelost door de nadruk te leggen op ‘de administratieve lasten’ die ‘verlicht zouden moeten worden’. De toenmalig Nederlandse Minister President Balkenende gaf, wanneer dit uitkwam, een deel van de schuld van de complexiteit aan de Europese Commissie. Deze opstelling is in combinatie met de complexiteit van de materie niet bevorderlijk voor het ‘draagvlak’ van die regelgeving. De burger en een bedrijf worden geacht zich aan de regels te houden die door de overheid – die ze zelf produceert – als een probleem worden omschreven. Dit fenomeen wordt in deze dissertatie omschreven als een probleem van legitimiteit. Op basis van het werk van Jurgen Habermas wordt een verbinding gelegd tussen de wijze waarop over regelgeving gecommuniceerd wordt (communicative action, public discourse) en de mate waarin een bevolking accepteert dat een overheid haar regels oplegt (legitimiteit). Naarmate deze regels minder aansluiten bij de belevingswereld van de burger of een bedrijf, neemt het draagvlak of de legitimiteit verder af. Er kan een proces van vervreemding optreden wanneer burgers en bedrijven zich geconfronteerd voelen met een bureaucratie, die een eigen leven leidt. Dit proces van vervreemding wordt erger bij het gebruik van steeds meer digitale diensten. De computer says ‘no’ en de burger weet niet waar hij met zijn probleem meer heen moet. Dit is een breuk met het oude concept ‘le contrat social’ van Rousseau: het impliciete contract van de burger met de overheid om het gemeenschappelijk belang te vertegenwoordigen in ruil voor het afstaan van macht aan die overheid (Rousseau).

Het vraagstuk van slechte dienstverlening en communicatie wordt in dit onderzoek opgepakt aan de hand van technologische vernieuwing. Kan informatie-technologie bijdragen tot de kenbaarheid van het recht? Helpt technologie om
aan burgers uit te leggen waarom een bepaalde beschikking later algemeen bindend wordt verklaard in een nieuwe regel. Kan de techniek helpen om te helpen om een beslissing in beroep te beoordelen? Technologie wordt door een aantal denkers met name bij toepassing door overheden juist met wantrouwen bekeken. Zij wijzen op het gebruik van TV en andere media als een instrument voor het kweken van kritiekloosheid, voor misbruik van macht en voor manipulatie. Dit debat wordt door politicologen veelal zwart-wit gevoerd. In dit proefschrift wordt gekozen voor een andere route. Dit is de route van het ontwerpvraagstuk. De onderzoeksvraag verplaatst zich daarmee naar de wijze waarop technologie het best zou kunnen bijdragen aan de kenbaarheid, de rechtmatigheid en de legitimiteit van het recht. Wanneer hier aangetoond kan worden dat informatietechnologie daadwerkelijk een bijdrage levert om burgers en bedrijven te helpen bij hun zoektocht om er achter te komen of zij toestemming krijgen voor een bepaalde handeling, dan is in de perceptie van de deze mensen de technologie geen instrument van machtsmisbruik.

Het Recht als infrastructuur voor dienstverlening

Tijdens de laatste 20 jaar heeft zich een uitgebreid gedachtegoed ontwikkeld op het gebied van (electronische) dienstverlening door de overheid. Daarbij is het perspectief steeds meer verschoven van digitalisering van papieren processen naar het door de burger zelf kunnen laten verrichten van noodzakelijke stappen (DigiD, belastingformulier, kadaster splitsing, PGB). De Europese Commissie stuurt op een aanpak waarbij de gebruiker centraal staat. Op het gebied van het recht zijn concepten van Legal information serving en een integrale ketenaanpak bij de omgevingswet een vertaling van dit perspectief. De vraag is of en hoe de technologie hierbij daadwerkelijk van dienst zou kunnen zijn.

3 experimenten

Voor dit onderzoeksvraagstuk zijn 3 experimenten opgezet. Het eerste experiment betreft de toegang tot het recht. Daarbij is als informatietechnologie gebruik gemaakt van digitale kaarten en hun vermogen om de vraag van de gebruiker in een context te plaatsen. Dit is een vorm van casus ondersteuning. De stelling is dat digitale kaarten als technologische oplossing een gebruiksven- delijkere casus ondersteuning bieden dan grote lappen tekst.
Bij de opzet van het onderzoek werd in dit stadium gekozen voor een doelgroep van ondernemers, die vanwege nieuwe regelgeving op zoek gaan naar een locatie waar waarschijnlijk wel een vergunning voor een LPG station afgegeven zou kunnen gaan worden. De ondernemer moest op zoek gaan voor een vergunning en was daar jaren me bezig. In eerste instantie is gewerkt met een prototype dat digitale kaarten een denkbeeldige casus aanbood in volgorde van de vragen die door de ondernemer aan het systeem gesteld werden. Op basis van de eerste onderzoeken is in samenwerking met Provincie Zuid Holland een werkend prototype met realistisch juridisch materiaal ingericht. Daarbij werd de gebruiker in staat gesteld om naar eigen goeddunken de mogelijkheden van een gebied te onderzoeken op basis van kaartlagen waarmee de vele beperkingen door de regelgeving letterlijk in kaart gebracht konden worden. Deze kaartlagen zijn van kleuren voorzien en aangevuld met toelichtende tekst over de specifieke bijzonderheden. Het was ook van belang dat er gegevens over transport, economie en demografie voorhanden waren om de casus van context te voorzien. Hier wordt een onderscheid aangebracht tussen toegang tot: informatie die relevant is voor de casus en kenbaarheid van het recht. De LPG-houder wil immers weten of de locatie in de toekomst ook klanten zal kennen. Deze gegevens zijn publiek voorhanden\(^1\). Daarmee was de casusondersteuning redelijk geslaagd. Tijdens het onderzoek bleek dat de functionaliteit bijdroeg aan de juridische vragen van de gebruiker. Er bleek ook een aantal vervolgvragen aan deze oplossingsrichting te kleven. De medewerkers van de overheid die de regels opstelt zagen op tegen de grote onderhoudskosten die een dergelijk systeem met zich mee zou brengen. Daarnaast bleek de ondernemer nog steeds afhankelijk te zijn van ‘klikken op de goede plaats’. De kaart gaf aan wat er waarschijnlijk mogelijk zou kunnen zijn op plaats X, maar dat gaf weinig beeld over de alternatieve mogelijkheden op alle andere plaatsen in het gebied. Er moest gezocht worden naar een technologische oplossing die informatie gaf over de mogelijkheden in het gekozen gebied, of zelfs over de locaties waar de ondernemer minder ‘last’ zou hebben om een vergunning te krijgen. De achterliggende vraag is nog steeds om aan te tonen dat technologie kan helpen om draagvlak te behouden voor ons rechtsstelsel. De methode van onderzoek verschoof intussen steeds meer naar een living lab benadering, een actiegericht onderzoek waarbij de onderzoeker zelf deel wordt van het team dat het ontwerp vraagstuk tracht op te lossen. Daar kle-

\(^1\) Deze constructie zou nu ‘linked open data’ heten
ven voor-en nadelen aan, zoals het draagvlak voor de oplossingsrichting en de objectiviteit van de onderzoeker. Het tweede experiment beoogt enerzijds om het onderhoudsprobleem op te lossen door middel van een service infrastructuur en anderzijds om diezelfde infrastructuur te gebruiken om de inrichtingsmogelijkheden in kaart te brengen van het gekozen gebied. Deze infrastructuur biedt daardoor nog méér de mogelijkheid om de gebruiker van het rechtstelsel centraal te stellen. De ondernemer wenst bijvoorbeeld ondersteund te worden met een bedrijfsactiviteit. Tijdens de start van het onderzoek diende hij zich fysiek te vervoegen naar een gemeente om te horen of de bedrijfsactiviteit daar wel of niet verricht mocht worden. De juridische infrastructuur bevat alle gebruiksdoeleinden in een gebied en kan de ondernemer aangeven waar de kans groot is dat de activiteit niet verboden wordt. Voor het doel van dit experiment is een prototype ontworpen en gebouwd. Het bouwen van dit prototype had een aantal onderzoeksdoelen. De overheden willen inzicht in de haalbaarheid en de uitvoerbaarheid van een dergelijke juridische service infrastructuur. Daar is een haalbaarheidsonderzoek voor verricht. Een tweede doel betrof de haalbaarheid van de concepten die als bouwstenen dienden voor een juridische service infrastructuur. Het betreft architectuur gebaseerd op standaarden rond interoperabiliteit (uitwisselbaarheid van informatie), standaarden voor ruimtelijke ordening (IMRO en de voorlopers van IMgeo2) en standaarden voor de consistente digitalisering van wetsteksten (CEN/Metalex). Deze concepten dienden in één werkkend prototype bijeengebracht te worden. Bovendien moest het aansluiten bij de werkprocessen van de provincies en andere overheden om de geloofwaardigheid en de haalbaarheid aan te tonen.

Een derde doel van het tweede experiment was gelegen in het feit, dat er door mij nog niet overtuigend getoetst was of de digitale kaart nu voor ondernemers preferabel was boven de gebruikelijke teksten als instrument voor het ondersteunen van het zoeken bij een casus. De doelgroep voor dit experiment was iets veranderd Richting tussenpersonen. Uit eerdere bevindingen was gebleken dat de ondernemers zich in de praktijk vaak laten vertegenwoordigen door specialisten. Als methode voor dit onderdeel is gekozen voor de SUMI (*Standard Usability Measurement Inventory*) aanpak om de resultaten te kunnen reproduceeren. Dit leverde een interessant probleem op. Het blijkt niet eenvoudig te zijn om deelnemers aan de hand van een standaard-vragenlijst aan te laten geven of ze een kaartinterface gemakkelijker vinden dan een tekstinterface. Bij open vragen is men
duidelijker en beter in staat om de nuances aan te geven. De bevindingen van dit experiment waren meerduidelijk. Het technologisch ontwerp bleek te werken. De concepten waren in de realiteit ook uitvoerbaar binnen de kaders die voor een infrastructuur noodzakelijk waren. De respondenten gaven een preferentie aan voor de digitale kaart als hulpmiddel, maar dit kwam in dit experiment niet vanwege een gemeten positief effect op hun werkwijze of hun efficiëntie. Er is onder meer sprake van een noodzaak om enige training te krijgen in het gebruik van dit soort technologie. Men gaf aan dat je als specialist in eerste instantie de papieren werkprocessen vertaalt naar de digitale en kaartgebaseerde versie. Daarbij valt een mogelijk voordeel gedeeltelijk weg. Uit het onderzoek bleek ook dat een aantal deelnemers met name behoefte hadden aan een instrument dat het samen ontwerpen van regelgeving kon ondersteunen (later aangeduid als ‘uitnodigingsplanologie’, van Rooij, 2012). De NGO’s, die een belangrijke groep vormen bij de besluitvorming over grotere trajecten van regelgeving, gaven aan dat de schade van reparaties achteraf in de rechtszaal veel groter was dan de inspanning die het kostte om te voren tot een uitgebalanceerd besluit te komen. Hierbij speelt de fasering van de bijdrage van technologie kennelijk een rol. De kenbaarheid van geconsolideerd recht is relevant, maar daar gaan veel fasen vooraf die ook door de technologie ondersteund zouden kunnen worden. Bezien vanuit het perspectief van een totstandkomingsproces van regelgeving, die loopt van eerste ontwerp, naar invoering tot aan handhaving en evaluatie, is een bijdrage in het beginstadium klaarblijkelijk effectiever dan in het stadium dat alle regelgeving geconsolideerd is. Voor het onderzoek naar legitimiteit van het recht is dit relevant. De theorie verwijst in de richting van co-regulatie, participatie en zelfredzaamheid als een instrument voor een groter draagvlak van regelgeving. De eerste ‘legal apps’ zijn inmiddels ontworpen en het duurt vermoedelijk niet lang meer totdat de burger een veel actievere rol kan spelen in het tot-stand- komen van regelgeving. Het derde experiment is gebaseerd op deze bevindingen. In nauwe samenwerking met de Provincie Flevoland is een voorziening inge richt op basis van de architectuur van de bovengenoemde infrastructuur, die het een reëel besluitvormingstraject mogelijk maakt om samen te werken aan het ontwerp van regels. De casus was zorgvuldig gekozen, zodat deze representatief was voor veel voorkomende afwegingsproblemen in de ruimtelijke ordening. Het betrof de bouw van wegen en bruggen en woningen in het gebied IJmeer/Markermeer. Hier spelen veel factoren een rol, zoals de bouw van 60.000 huizen, het winnen van zand, de rust van de eilanden, de recreatieve waarde van het
IJsselmeer en bovenal de natuurwaarden van het zoetwatergebied die Europees gezien van belang zijn. Tijdens het besluitvormingsproces van deze casus is een derde prototype gebouwd op basis van de eerder genoemde concepten, dat het mogelijk maakt om kennis te delen, recht raad te plegen en samen te komen tot een optimum afweging. Deze faciliteiten door middel van technologie vormen de operationalisering van de theorie van Habermas over 'common situation definitions' en 'harmonising plans of action' in relatie tot legitimiteit.

Als doelgroep voor dit experiment is gekozen voor de beslissers die verantwoordelijk waren voor een afgewogen besluit over deze omvangrijke casus. Dit vergde de nodige zorgvuldigheid om het politieke proces niet te laten verstoren door de technologische interventie. De resultaten van het experiment waren bemoedigend. De respondenten zagen in het prototype een relevante bijdrage in een aantal fasen van de besluitvorming. Tegelijkertijd zag men minder bijdrage in het uiteindelijke besluit, omdat daar de informatieuitwisseling geen grote rol meer speelt. Het vertrouwen in de overheid als regisseur van het proces was groot. In veel gevallen was men al redelijk tevreden over het proces en werd het door het instrument nog veel beter geacht. De regelgever was eveneens enthousiast over de voorziening, omdat deze naadloos paste in de ICT infrastructuur die de Provincie toch al gebruikte voor het primaire proces. Dit voorkomt dat men elke keer opnieuw een (dure) simulatie van het het domein of de casus moet maken.

De simulatie komt door het gebruik van de standaarden immers automatisch voort uit de productieprocessen van de provincie. Er kan vastgesteld worden dat digitale kaarten een bijdrage kunnen leveren aan casus ondersteuning (Legal information serving) en aan co-regulatie. Er zijn verbanden tussen de bijdrage van digitale technologie en de fase waarin de regelgeving zich bevindt in de productiecyclus. De operationalisering van legitimiteit van Habermas biedt duidelijk aanknopingspunt voor de communicatieve fasen van regelgeving en besluitvorming. Het kwantificeren van de bijdrage aan legitimiteit vergt meer onderzoek naar de concretisering van dat begrip.

Als conclusie van het onderzoek mag gesteld worden dat technologie een bijdrage kan geven bij de legitimiteit van het recht. De stelling dat technologie een instrument is voor machtsmisbruik door overheden is niet juist. Uit het onderzoek blijkt dat er zich echter een ander probleem kan voordoen door de inbreng van de technologie bij de uitvoering van complexe wetgeving. De technologie kan het gevoel van onmacht van de burger of een bedrijf ten overstaande van een digitale
bureaucratie nog verergeren: bij ‘computer says no’ is de kans op wrevel of een gevoel van onrechtvaardigheid en daarmee vervreemding groot, zodat dit een-serieuze bedreiging voor de legitiemiteit vormt. Vervreemding ontstaat niet door onwil, maar door een slecht vormgegeven ontwerpproces. Uit het onderzoek blijkt daarnaast, dat de willekeur die bij de street-level bureaucrat kan ontstaan, bij de digital of system bureaucrat ook kan ontstaan, zij het op een andere, moeilijker toegankelijke manier. Vervolgonderzoek zou zich verder kunnen richten op deze facetten van technologische ondersteuning van het recht en op de beschikbaarheid van nieuwe technologieën voor burgers en bedrijven, zoals juridische apps. Het proefschrift sluit met een aantal suggesties voor vervolgonderzoek en een uitgebreid hoofdstuk met aanbevelingen voor het digitaal ontwerpen van juridische uitvoeringsystemen. Deze aanbevelingen zijn deels gebaseerd op de huidige (2015) ervaringen met de ontwikkelingen rond de nieuwe omgevingswet in Nederland en op de toepassing van de techniek in de sector Veiligheid.

1. Stimuleer de standaardisatie van de ranking van regelgeving; welke regel geldt boven welke andere regel;
2. De intenties van de beleidmaker of wetgever dient zichtbaar te zijn bij de uitkomst van een digitaal proces;
3. De afweging van diverse perspectieven en aspecten, bijvoorbeeld de economische aspecten, de ruimtelijke aspecten en de milieuspecten dienen integraal afgewogen te kunnen worden.
4. Het ontwerp van de juridische dienstverlening dient gebaseerd te zijn op digitale beginselen van opzoekbaarheid, onderhoudbaarheid, workflow afhandeling en metadata in plaats van op papieren beginselen.
5. Versiebeheer, archivering en de factor tijd zijn belangrijke elementen voor het digitaal ontwerp van juridische diensten;
6. Transparantie van het systeem en van de systeemparameters is essentieel en wordt nog essentieler in een digitale omgeving;
7. Ons wetstelsel dient ook gezien worden als is een dienstverleningsinfrastructuur
8. Semantische transparantie en consistent gebruik van terminologie is noodzakelijk voor een juridische dienstverleningsinfrastructuur;
9. Het experimenteren met digitale vormen van co-regulatie zou gestimuleerd moeten worden;
10. Bij digitale experimenten met co-regulering is het van belang om het afwegingskader van te voren met de actoren af te spreken; dit voorkomt veel discussie achteraf.
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Abstract in English

Law is being digitalised. When this research started, the notion of digitalisation of law was rather new. The early attempts were basically websites that provided a search on legal sources. The question was occurred if this would really be helpful to the citizen. The general research question evolved from there. Can internet technology actually help the citizen in navigating law or does the mixing of these worlds create a digital bureaucratic labyrinth? To examine those questions, a lot of exploration and scoping had to be done. What technology are we addressing here and what type of ‘help’ do we mean? And which Law is implied? And if a citizen is not ‘helped’ by the computer, could this affect his or her relationship with government? To analyse the landscape I have divided the potentially assistive role of technology into three sub parts: Access to relevant legal sources, legal effect planning in a use case context and the support of the process of the design of Law. To investigate the influence of digitalised Law on the relationship with government, I had to explore theories about legitimacy, bureaucracies, trust and violations of ‘le contrat social’ between citizens and government. It was also necessary to look back through history to achieve a better understanding of the role of technologies in relation to law through the ages.

Since the research was triggered by a design problem during the early building process of www.overheid.nl, the Dutch National service website, I decided take a design approach to the exploration as a whole. This approach also implies the design and building of new technology and experiments with relevant stakeholders to find out if the potential role of technology could be improved by a dialogue with these stakeholders. This perspective shifts the debate from a black-and-white controversy about pro’s and con’s of technology towards a discussion about adequate design processes. Such an approach is logical from an engineering point of view. It was not so common in the legal arena at that time, however.

One of the important ideas that surfaced from these iterative discussions is the possibilities of digital maps to improve on the weak points of paper and text as information technologies. This potential is investigated in-depth and results of the experiments are explored to pinpoint the contribution of maps to the user needs as precisely as possible. Some of the results were less than were expected when operationalised in terms of efficiency, while at the same time the technology was well received or preferred by the respondents at the when questioned in more general terms. These discrepancies are discussed in detail in order to distinguish between interface design, learning curves and the intrinsic attributes of text and digital maps.

A second important ingredient was the introduction of smart semantic technologies in the very production process of Law to enable more relevant search results. In combination with maps this approach delivered the promise of legal effect planning. A businessmen or a city planner could actually plan in advance the effects of regulations on a certain area or neighbourhood. While seeking an operationalisation of the link between legitimacy of Law and the problems of digital bureaucracies, I came across the ideas of Jurgen Habermas, who had introduced the possibility to support ‘harmonisation of plans of action between stakeholders’ as part of his discourse theory. This notion matched well with the process of co-design of Law among the stakeholders and legislators at the Province of Flevoland with whom I was collaborating at that point in time. To explore the possibilities of co-creation of law by means of technologies, this Province allowed me to experiment
with the ideas right in the middle of their ‘political kitchen’. This research opportunity is rather unique if one takes into account the risks and stakes involved. The teams that were involved in the design, building and testing of the technology became a collaborating group over time, where my position as a scientific observer was soon replaced by the position of an action researcher trying to coach the team effort into something productive. This approach and the way it was organised here is called a living lab approach. I have spent many pages describing the different contexts of the three experiments and I hope that other researchers feel inspired by this living lab approach.

A simple answer to the main research question is that technology can indeed help with providing better access, better effect planning and improved co-design of law, thereby increasing the legitimacy of Law. However, it became also increasingly clear that a bad design of technology can result in the opposite, which was perfectly symbolised by Little Britain in one of their sketches by the famous phrase: ‘Computer says NO’ (see youtube). It is also made clear by the research results that internet technology requires a learning curve, that professional assistance is therefore still required and that information technology such as the internet technology chosen in these experiments can help with harmonisation or mutual alignment of plans of action but it cannot assist in the final decision making process.

The distinction between informing citizens and the actual decision making in the legal life cycle is important to further investigate the relation between digitalisation and law and I have made some proposals for these distinct stages and their significance for setting up future research. In the meantime, internet technology and mapping technology have evolved towards a higher level of maturity where legal service apps and digital spatial plans are the norm. The process of the digitalisation of Law has taken up speed in The Netherlands. Spatial Law is now completely digitalised and de Dutch Raad voor de Rechtspraak has embarked on a major effort to process most of the simpler court activities by digitalised means. The design of these processes is now indeed supported by ‘klant reizen’ (translates as client journey’s) and scrum sessions which are recognised as sophisticated design method ingredients.

Still there is a lot of improvement necessary to realise a design of legal services that is more user friendly. The last Chapter is written for that purpose. The policies driving the new ‘Omgevingswet’ in the Netherlands seek to achieve a more integrated design process and a process that includes active participation of the citizen. These goals pose a high standard of requirements for the digitalisation of the design process. These requirements are especially relevant if one seeks to avoid a gap in the considerations in the documentation during future (digital) cases in court.

I hope this work will contribute to the field of research on Law that seems - until now - underestimated because of some excellent reasons. Digitalisation at this point in time affects mostly the executionary side of our legal infrastructure, whereas the design of Law and the judgement about disputes in our courts are positioned on other sides of the borders that comprise Trias Politica. It remains to be seen if these old institutionalised borders will be maintainable in the near digital future, but this is for other investigators to explore.
The problem of legitimacy of the legal system
1.1. The problem of legitimacy of the legal system

Law is probably the backbone for any democratic society. Law is also seen by many citizens as a puzzle at best, a labyrinth at worst. Dutch government build websites to help the ‘citizen to navigate the labyrinth of law’. Citizens regard law as a phenomenon for which one requires professional guidance. This situation is experienced as the normal status quo. From the perspective of many of those citizens law is a very important part of government. The effect of laws and norms is what they experience as a significant influence of government on their lives and businesses. Sometimes these effects are cause for confusion and feelings of injustice: a consultant hired by the BOVAG umbrella organisation for Dutch Garages and LPG stations told me the story of his Kafkaesque search for new locations for LPG stations for the station managers. Those managers had been told to leave their current locations due to new safety regulations, but no alternative locations were offered by the government that had banned them. Following this event, business managers had been repeatedly sent away by one city council, to file their requests to the next city council. No supportive overview was available to aid their search for legitimate spaces. The confusion is often followed by a sense of bewilderment. ‘How can ‘they’ do this to me?’ ‘They are my government!’?

If accessibility to legal information is indeed in such a regretful shape, what would this state of affairs do to the relationship between the government and citizens? If law has such a central role in guiding the citizen’s behaviour, should it not be made more accessible? Should it not even be knowable or understandable to an average educated citizen? Can we still accept such a low legal service level from our government? What happens to the legitimacy of law?

We are now in the so-called ‘digital age’. People are getting used to download ‘an app’ to find things and to fix things. Should not accessibility of law be fixed?

Over ten years ago, governments have started to apply digital technologies to support legal information processes. In 2002 the then recently established ICT implementation organisation for the Dutch Government (ICTU, Ministry of Interior) ordered the building of www.overheid.nl. This ambitious project — its results are shown in Figure 1 — was to be THE main single point of entry for citizens and businesses to receive answers relevant to their needs from the entire government. I had the honour of being its project manager. Building the website took nine months and finished in 2003. It consisted of hundreds of website pages, involving thousands of links to other government sites and it intended to guide and provide the visitor with answers to legal questions. For that reason the website had to provide access to the Dutch body of law: “Het Basiswettenbestand Der Nederlanden”. This official legal database was maintained by SDU, formerly known as the Dutch State Printing Office. For the interaction design of this National Governmental Portal it was challenging to provide regulations relevant to the context of the person entering keywords in the portal search functionality.

1. https://www.sdu.nl/geschiedenis
Any keyword entry did result in hundreds of hits that might or might not be relevant for the questioner. The means for problem articulation on part of the client were inadequate. How was he/she able to express his/her problem on a website page that should provide answers to all legal permissions and prohibitions? How would a layman know the relationship between a wish for building a shed and the fact that this required a specific building permit, which is described in some legal source, in this case a specific WRO-article in the body of the Dutch law? The focus of this dissertation is the increasing role of technologies in relation to law. Law is getting more complex and the gap between law and the citizen seems to increase. In 2010, the Dutch government advertised on radio broadcast a site called “antwoordvoorbedrijven.nl” – which translates as ‘anwersforbusinesses.com’ – that explicitly states its functionality as ‘supporting the entrepreneur in navigating the labyrinth of Dutch laws’. This portal, which is yet another technology solution aimed at solving problems accessing law, clearly demonstrates the belief that technology should be used to overcome the barriers that users of law experience in their daily lives. For this thesis the question is if better design, implementation and use of technologies could increase the service level for businesses about policies, regulations and norms. Could we develop such technologies that could guide people through ‘the labyrinth of regulations’? And if that were possible, should we then decide to invest in such a ‘legal service infrastructure’ that would provide us this guiding on a permanent basis? Could technology perhaps even help to support legitimacy of law on a more fundamental level?

I. The citizen perspective:

In this research I take the perspective of the user of law. It is a perspective that focuses firstly on the citizen as the user of a legal system that should inform him about his rights and obligations. The portal-technology described above did not provide the required service level; it only reproduced legal source information in another form and made it accessible through web access rather than the traditional paper based format. The problem
of how to provide access to legal texts - developed into how to support case assessment for business managers and citizens. The texts in themselves meant little to them if they were not put into the context of the socio-economic or environmental situation of the activity at hand.

In Chapter [II] I will focus on this particular access-to-law perspective. More specifically, I will describe this as: *the legitimacy challenge of knowability of legislation*. The content of those rights and obligations itself is not so much the focus. I am rather more interested in the process or the means by which the government provides this content. The government is seen as a provider of a service, which is the provision of relevant legal information about what a citizen can and cannot do. The citizen is seen as the user of that service. This perspective on law-as-a-service is called legal information serving (Breuker, Winkels, 1992). Thus, I try to bridge the gap between - to give just two examples – a small business manager who requires an answer to questions such as: “Where can I place my LPG station?” or “Will they allow me a permit for a new boating marina?” – on the one hand - and the legal information available on these issues on the other hand. As I will demonstrate later in this chapter, current access methods to our regulative body are becoming more and more inadequate due to the increased complexity of rules, speed and growth of developments and costs of maintenance of the legal body of regulations as a whole. This development may threaten the legitimacy of the legal system in the eye of citizens and business managers. If a law is hard to apply to day-to-day businesses, difficult to plan for, unclear in its effects on the society and undermined by politicians, it becomes difficult to expect that citizens will obey that law without seriously questioning its legitimacy. The origins of this research stem from the technological solution for a legal information provision at the Dutch national level (the portal), which seemed to fail to provide the required service and did not seem to support legitimacy. This phenomenon sparked the search for better fitting technical designs and enhanced support to balance interests during the legislative process.

*Figure 2: Perceived Gap between user of legal system and government as system service provider.*

- User or customer with a legal question
- Government providing legal sources
- Potential of Technology to bridge gap and improve understanding
II. The government official:

The search for better ways to serve the citizen and the business manager regarding permissions, prohibitions and relevant advice turned out to continue far beyond the citizen as the only problem owner. The government itself, as it turned out during the second phase of the research, had problems with identifying the effects of any legal decision on spatial planning. A good example of this problem was encountered while listening to the story of a city planner who acknowledged problems with the planning documents in the Town Hall of the city of Arnhem in 2004. Changes to plans in this city – and in fact in many cities – were made by sticking notes to paper plans, and these notes became dislodged over time. The business manager was still seeking his answers and the contours of a solution area became visible, but the problem owners themselves were also troubled by the lack of insight in the relation between policies, regulations and the effect in reality. Government actors are users of the same regulative system, in this perspective.

The problems depicted above are addressed in chapter [IV] and [V] of this thesis. In those chapters I will focus on what I will define as the legitimacy challenge of legal planning, effect measurement and feasibility. To counter the challenges of the manager and the government actors, one has to design a user-centered service infrastructure. To support the link between legitimacy, legal information serving and eGovernment services some elaboration on the concept of government services is required at this point. The LPG station manager is faced with a searching problem, which, in his case, is caused by government, because they banned him from the spot where he had his station in operation. This decision is in fact the result of a policy, agreed by a democratic system representing the interests of all citizens, aimed at governing spatial planning in certain ways, in this case a manner that was seen as safer. The moment of bewilderment and the feeling of injustice were not caused by the content of the decision or by the fact that business owner had to move his operation, but by the fact that he had to find his own way through a labyrinth of rules without active support to navigate that labyrinth. The legitimacy challenge of knowability is related to a perceived lack of governmental service.

‘eGovernment concerns the informatisation of the public sector and service to the public and improvement of government productivity are its main goals’ (Van Engers & Boer, 2005). eGovernment services are automated versions of the execution tasks of the administration in line with the democratically sanctioned, or ‘legitimised’ regulations. eGovernment services have become the focal point of many action lines of the European Commission and national authorities to enhance the service levels for the citizens. This approach is often called a “citizen-centred” approach.

The user-centered perspective on eGovernment services, also taken by the European Commission (ECCOM2010, 744 Final), puts more focus on the interests of external users rather than the organizational structure when determining which services the government should offer. My claim is that there is a relationship between the perception of law-as-a-service and the erosion of ‘Le Contrat Social’ as defined originally by Jean Jaques Rousseau, exemplified by the LPG business manager, which I described as the legitimacy challenge of knowability in the previous perspective. Treating navigating the law as the mere problem of the user would violate the covenant between citizen and government.
III. The NGO chairman and the creation of balance

The problem of alienation and legitimacy is observed in a number of areas related to incidents that occur in our everyday life. During a conference on collaboration concerning the new plans for the Dutch Markermeer green area, one example occurred. This area is subject to a whole league of legal regimes and lawyers from both the economic development side and the environmental protection side. The argument about the plans for the Dutch Markermeer had been there for years. During that conference, Wout Sterken, chairman of the powerful Bird Protection Society stated, that over the last 30 years, he had been in court many times. Although he could establish that he had won a half of all those court cases, he also observed that ‘his’ birds did not benefit much from all those won fights, since the results of the dispute generated such a fragmented map of the areas where he had won and the areas where he had lost, that no integrated ecology was left to fly in. Government has set regulations to balance interests in the society from the perspective of the community as a whole (Grimmelikhuijzen 2012, Sharf 1999). On the micro- and macro-level, these regulations require ‘accessibility’ and ‘explanation’. Sometimes the introduction of new regulations or the application of regulations in specific cases even require an extensive explanation to avoid populist media reaction. Populist speakers know how to fuel the public sentiment of “Not-in-my-back-yard” (NIMBY) quite effectively. ‘Please save the climate, but not here’. It appears to be a challenge to create a transparent public discourse to balance interests. Public authorities seek ways to support this balancing act. Citizens are known to question the legislature when a certain type of hamster (korenwolf\(^2\)) stops the building of a highway (Dutch A73) for ten years. At the same time citizens agree that too many highways would ruin their living environment. In some cases it seems that the national level explicitly questions the European higher level of legislation, by suggesting that law is something ‘one should seek all space for manoeuvring in’. In 2013, the Dutch Prime Minister Rutte states ‘that all the surplus of paper spent on the environmental protection is bad for the environment’\(^3\). Government seeks ways to enlarge the manoeuvring space in view of the declining public acceptance of the existing compromise between different interests. For them there are political risks at stake, but for society there is the risk of erosion of the legal system, less compliance and more effort in enforcement. If the leaders of the government itself undermine the legitimacy at a higher level of government, this does not help with the legitimation of our legal system at any level. In the Dutch tradition of law-abiding citizens, this seems to be a new development. A similar phenomenon occurs in the practice of other Dutch Ministries, where the pressure to explain regulations and ‘government services’ is increasing. Programmes like the reduction of ‘administrative burden’ from the Ministry of

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2. The ‘Korenwolf arrest’ or ‘wild hamster arrest’ was mentioned in several rulings of the court that the enlargement of the Heerlen-Aken business area could not be permitted by the Provincial council given a lack of investigations in alternatives that preserved its habitat, as state in the European Habitat directive. This caused several newspapers in July 2000 to rename the animal the “12 million guilder korenwolf” because of the economical damage it supposedly caused. It became the symbol of lack of legitimacy.

Economic Affairs and the European Commission or government websites designed to ‘help the citizen through the labyrinth of law’ can be seen as clear signs. Given the examples like the Markermeer birds and the korenwolf and difficulties of government with the explanation to the public, an additional question is, whether technology could be used to improve the support for understanding the interests and the fair balancing of those interests during the policymaking process.

The examples depicted above all show the complexity of balancing interests between different stakeholders during the legislative process. This topic will be addressed in chapters [VII] and [VIII] of this thesis. In those chapters I will describe the use of technologies that should support the balancing process that is supposed to maintain the fabric of commitment from citizens to government to obey laws, follow rules and stay civilised. This commitment seems at least partly dependent on an unspoken covenant that government in return tries to act reasonably, sets out the rules in understandable ways and makes balanced decisions that make sense. Feelings of injustice occur when that government is thought to violate that covenant. Those feelings seem even stronger when that violation of the covenant is provided by a computer (Computer says ‘No’). The investments that governments make to prevent citizens from losing their commitment to obey laws, which deteriorates support for the legal system, are defined here as ‘legitimacy costs’. Thoughts about this covenant between the State and the Government have laid the very base for the establishment of the Dutch state. It has been addressed in the ‘social contract theories’ as early as in the time of Hugo de Groot (De jure belli ac pacis. 1625), Thomas Hobbes (Leviathan in 1651) and Jean Jacques Rousseau (Du Contrat Social, 1762). The basic idea is that citizens offer some of their liberties in return for services that can only be provided by a ‘public’ organisation. Many years later, Sociologist Habermas continues that discussion and connects the theories about law and legitimacy to manners of communication and the dangers of the increasing gap between the public organisation and the perception of citizens. ‘The positivation, legalization, and formalisation of law means, that the validity of law can no longer feed off the taken-for-granted authority of moral traditions, but requires an autonomous foundation, that is, a foundation that is not only relative to given ends. It is here that the idea emerges for the first time, that legal norms are in principle open to criticism and in need of justification’ (Jürgen Habermas, a theory on communicative action, Reason and the rationalization of society, 1984, P.339). Habermas builds on Weber’s extensive theoretical work, where the establishment of bureaucracies as a necessary invention for societal development, is set as theoretical framework for rationalisation and formalisation. (M. Weber, 1905, 1921) Both Weber, Habermas and a range of later exponents of critical theory in Sociology warn of the danger of alienation of the citizen from an increasingly bureaucratic legislature. So what can be said about alienation in and electronic bureaucracy?

The Dutch Council for public administration recognised some of the covenant similar to Le Contrat Social in their definition of legitimacy: ‘Legitimacy counts as the criterion for all governmental actions and can be described as the societal acceptance of those actions’, (Dutch National Council of Public Administration, 1999). I will use this definition of the term
in this thesis. In this research I need to operationalise the terms like legitimacy and law in a framework that would enable meaningful questions, experiments and validation of the outcomes. For that purpose, I have chosen to use the ideas of Habermas. The sociologist Habermas defines the relation between law and citizens as ‘communicative rationality’ and the debate involved as ‘open discourse’. Habermas is the author of a number of extensive books on legitimacy and communicative action (Habermas, 1975, 1981, 1984). Habermas’s study of the gap between government and its citizens with regard to law was caused by his experience with the Nuremberg Trials and a criminal regime. This study is still continued and has inspired many sociological researchers all over the world.

[...] “Whatever form law and legal procedure may come to assume under the impact of these various influences, it will be inevitable that, as a result of technical and economic developments, the legal ignorance of laymen will increase. The use of jurors and similar lay judges will not suffice to stop the continuous growth of technical elements in the law and hence thereof its character as a specialists’ domain. Nor can it prevent the spread of the notion that the law is a rational technical apparatus which is continually transformable in the light of expediential considerations (zwechrational) and devoid of sanctity or content.” [...] (Habermas p. 350, 1984)” After thorough analyses of the gap between the ‘lebenswelt’ and the ‘formal governing structure’, Habermas steps away from the political debate about power and redefines legitimacy of law as a communication process. He defines improved discourse as ‘common situation definition’ and ‘harmonisation of plans of action’ (Habermas, 1984). In my research I will address this communication issue within the context of co-creation of legislation. I will elaborate in Chapter [II]. Habermas seems fully aware of the factors that caused these ‘moments of bewilderment’ as described of those business managers, civil servants and the Markermeer pressure groups as described earlier. Without heartfelt legitimacy of law, only constant and consistent enforcement can ensure compliance to regulations and so, a lack of legitimacy has to be countered by more enforcement and more regulations. Technology could worsen this process. The digitalisation of those rules can result into a digital bureaucratic labyrinth, resulting in alienation. Is technology perhaps going to create a digital – and therefore even more frightening - version of the Kafkaesque government? (F. Kafka, 1921). One can easily imagine the citizen lost in the digital labyrinth of several municipal government websites pointing at each other. Information technology could perhaps enhance the labyrinth or provide guidance through it, but the research described here will later demonstrate some serious issues about the combination of bureaucracies and technologies. The perspectives depicted before and the issues that arise from those examples led me to the following initial research question:
This PhD dissertation follows Habermas’s theory of communicative rationality to investigate whether information technology can *bridge the gap* between the citizen and law and reduce the resulting alienation that may cause erosion of legitimacy.

In the chapters indicated I will further explore the stories involving the three actors – the business manager, the government official and the NGO chairman. Their moments of bewilderment when the law seemed disengaged from society were characterised by a certain sequence of reactions. At the first stage there was a complex emotion that could be called ‘a feeling of injustice’. Why is this government so unhelpful? Why does government not know the consequences of their own laws? How is it possible that our legal environmental protection system results in more harm than benefit to birds? This phase was often followed by a step back from the specific case and a search for the mechanisms ‘behind’ that case to an overall system perspective. On that level, the injustice is usually substituted by the recognition of the fact that we, as a society, are often not able to get things organised properly. Immediately thereafter the bold designer wants to solve the problem with a solution. Let’s build a better website! Or: ‘lets create a better search engine!’ Then the scientist kicks in with some more humility and requires a model that can substantiate any measurement of improvements. What is it that is improved actually? Whose problem are we solving here? Why has it not been solved already? Why is that problem so difficult to solve? At a much later state another question became a more common public debate. This is the question why ‘ICT projects in government fail’. Here the consultant in me demanded attention. ICT project always fail because humans fail to recognise the complexity of the interaction of many regulations. The overall result of this process has been a designer’s view on the theme of legitimacy.
1.2. Technology: a friend or an enemy?

This thesis is about the role of technology in relation to law and legitimacy. Technology has been used in relation to regulations since the first clay tablet, printing machine, the tax ‘floppy disk’ and in many websites. Technology and especially digital technology is becoming more and more central to the many dimensions of Law. At the same time the complexity and pluriformity of legislation is increasing and the citizen is becoming more demanding. The question whether technology could help to overcome the barriers of coping with legislation is not without issues. Technologies can be abused in the wrong hands and the debate about the ownership of information on the internet, for example, is very much alive. Members of a critical research group often referred to as the Frankfurter Schule, especially Herbert Marcuse (Marcuse 1964 in Ritzer, 1988, p.133) and, later, politically active scientists such as Noam Chomsky (Chomsky, 1988, 2008) see media and other information technologies as instruments for totalitarianism. Marcuse defines technology like television to be a way to socialise and pacify the controlled population (see chapter [II]). The Habermas – Foucault dispute about power and civil society has fascinated generations of thinkers, where one side claimed Habermas was an unrealistic idealist and the other side claimed Foucault destroyed the bases of concepts he was standing on. An interesting question for this dissertation is, whether the idealistic ideas of Habermas about ‘open discourse’, ‘speech acts’ and ‘communicative action’ could be made more real using information technology. In the late 90s, during the broader uptake of the information age, researchers like Snellen, Bekkers and Zuurmond focused on this particular type of information technology. Zuurmond (Zuurmond, 2000), for example, investigated the influence of information technology on the formalisation and “control reflex” of bureaucratic organisation – wondering if information technology will increase Kafka-like labyrinths for the citizen. Others focused on the effect of information technology on direct democracy. Bench-Capon (1997) and Van Engers (2003) argue in different ways for a redesign of Government services based on the possibilities of technology. According to them, the design of legal Government services should be seen as a production cycle from legal drafting to policy effect. Noam Chomsky is one of the scientists whose distrust in technology more recently was countered by his newer insights into the growing potential of the Internet technology as a driver for legitimation (Chomsky 2010). Heeks, however, stresses that the information overload of the Internet only diverts the attention from the actual problem; government information systems hardly produce any information that can be used to hold government to account (Heeks, 1998). O’Neill argues that transparency will erode trust. This author states that the Internet makes it possible for governments to disclose a great deal of information and misinformation. This latter will produce less trust, allowing a culture of suspicion to arise (O’Neill, 2002, p.77). Kraemer and Dedrick argue that ‘existing elites would use their control over the acquisition and application of computing technologies to maintain their powerful positions’ (Kraemer & Dedrick 1997) and that the use of ICT’s is merely a continuation of the old ways of
controlling the information streams from the elites to the public, albeit cheaper and available 24/7 (Kraemer & King, 1986). Others, such as Jean Baudrillard go even further and posit that the speed of communication based on technology brings an end to “ideals” and “meaning”, encouraging thinking that everything is a constructed reality without external legitimation. Kirby describes a superficial Digi-modernism where the Internet technology and social media are vehicles for ‘pseudo culture’ (Kirby 2006).

A different insight about measuring if technology is supportive or not, is given by Peter Verbeek, who points out that such a “yes” or “no” debate is futile. ‘Since human existence has been shaped by technology it is hardly defensible that those technologies can be seen as simple instruments that are to be trusted or perceived as a threat’ (Verbeek & Kiran 2010). The authors make a case for taking responsibility for the meditative character of technology in the way humans deal with the world. Verbeek illustrates his point with the distinction between ‘trusting on technologies’ versus ‘trusting ourselves to technologies’. The first instrumental point of view treats technology as augmentation of men without influence (extensionism). The second position is that of the human interacting with technology whereas the possibilities of those technologies influence the whole system (Meditative position). Quoting Heidegger, Gibson, McLuhan and many other thinkers, he makes a case for the second, more engaged position: “There is yet another aspect that makes it hard to hold on to technological instrumentalism – an aspect that is highlighted especially in ecological psychology. In a technical action, a technology actually realizes some of its action potential – and this we can call, using a term coined by psychologist James Gibson, the affordance of a technological item (Gibson 1982). Technologies afford certain ways of being handled, and through that, they afford specific actions”. Verbeek continues to investigate the relationship between humans and the fact that most of their existence is shaped by technology. He arrives at the concept of ‘caring’ for this relationship in a more active manner: “Using technologies means that we are in our surroundings in specific ways, relating ourselves to the aspects of the world that technologies help to accentuate and stand out. Technologies co-shape the appearance of the world; we do not just see a world, the world appears to us in certain ways: technologies structure and organize the world”. The “caring” as described above results in engagement and responsibility rather than the too-simple position of technology being either “right” or “wrong”: “In this re-interpretation, saying both ‘yes’ and ‘no’ to technology does not imply a minimization of one’s involvement with technology, but rather the development of explicit engagement with it. It does not consist in avoiding technological mediations, but in recognizing them, and in getting involved in the ways they affect our existence. Instead of keeping a safe distance to technology, this form of self-care embodies a secondary form of distance: it entails both being involved with technology and taking a stance toward this involvement.” Verbeek states: “This, however, does not imply subjecting ourselves uncritically to them, but rather recognizing that technologies help to constitute us as subjects, and that we can get actively involved in these processes of mediation and subject constitution”. Bert Mulder states that the real challenge with information technology and government services is to enable the citizens to help themselves, by better, more understandable and more integrated design. He states that there is no notion about the requirements for integrated information provision in the ‘life world’ of the citizen, since most service design is implemented from a fragmented legal system design perspective (Mulder 2015).
and Mulder arrive at the same type of argumentation as Habermas: one has to engage and discover the peculiarities of this Internet technology (again an open discourse on another level) to handle the mediating effects in a responsible manner. The research question then becomes more that of discovering the extent to which technology could be supportive. The common position taken by the researchers referred to above suggests the following: There is a tension between those who oppose information technology as a supporting vehicle for legitimate legal administration and those who favour information technology as the means to increased engagement and shared responsibility.

This tension requires further investigation in the application of technology and its influence on legitimacy. This investigation is explorative in nature.

I will explore if a better design of the legal infrastructure can support legitimation of law and I claim that the position defended by Marcuse et al – that information technology in de hands of government is always an instrument for manipulation and depersonalised bureaucracies – is false.
1.3. Three dimensions of law and legitimacy

In the descriptions above three different perspectives regarding law are being recognised that have impact on the legitimacy of that legal system. This view is visualised in figure 3 below to clarify the model.

- Law as a service environment where citizens are clients of the legal system when they need to know what is allowed and what is not allowed (use case assessment).
- Law as the implementation of those policies, regulations and norms where government officials are responsible for the effect of the legal system in its environment (legal effect planning).
- Law as the result of a policymaking process that results in regulations and norms (fair interest balancing).

Figure 3: Three perspectives on law and policy making.

For all those dimensions the role of technology will be investigated.
1.4. Legitimacy, maintainability and the feasibility of a service architecture

During the search for improved access to legal sources and more user-centered services, it became clear that such a legal service has to be investigated from at least two sides: the production side and the client side. Government officials are responsible for the process from policy making to the publication of norms and regulations. This administrative task proves to be increasingly difficult. The stress of the Arnhem Government official who expressed his anxiety about the lack of insight in cause-effect relations regarding laws (deducing those effects from marks of glue) was not caused by his belief that the regional authorities could not solve the problem of replacing paper with digital versions of a plan. His worry concerned the enormous complexity of our pluriform society and the legitimacy costs that would occur when the bureaucrats would be faced with an impossible mission to make it all work in a consistent manner. He envisioned the alienation (Geyer, 1996) caused by a system of rules that had gone out of control and he feared the moment that the taxpayer would have found out the extent to which this problem really was growing. He also feared the feasibility of any solution that claimed to solve this complexity issue.

A better design covers the whole range of acting government agents, is cost effective in its policy implementation, case handling and enforcement and improves the access and involvement of citizens. Cost effectiveness, primarily defined as low content maintenance costs and alignment costs with other internal processes is an aspect that was raised primarily by the government experts involved in the experiments that are part of this thesis research. These experiments will be introduced later. The fact that one does not design and develop for one sector, covering one task, but for a pluriform range of physical activities of business and people that require regulations implies an obvious business case for standardised maintenance and cost effectiveness. The artefact for such standardisation and cost effectiveness is a national information infrastructure. The activities of businesses seeking answers cover domain areas like building, recreation, transportation, energy, environment and so on. This service infrastructure should be designed in such way that the processes of accessing regulations and balancing interests are accessible, consistent, contingent, efficient, effective and transparent, thus improving legitimacy.

It rather makes sense from a feasibility, efficiency- or cost perspective to create an information infrastructure based on architecture and standards and capable of handling several varieties of content from different sector domains.
An Information infrastructure for law is similar. In Chapter [IV] I will explore the implications for a legal service infrastructure. In this thesis I follow a design approach concerning legal services. It presents research about the design of some essential building blocks of a legislative services infrastructure. I will have to substantiate that there is a relation between information provision and legitimacy. I defend that, given the right design, these three contributions help to increase the legitimacy of law. This research contribution is a legal service design theory.

Legal servicing is not a new concept in science about law. Breuker and Winkels call this legal information serving (LIS) (Breuker 1992, winkels 1998, 2002). I will argue in Chapter [II], that it is necessary to create a legal service infrastructure to make legal servicing feasible.

1.5. Operationalization of the research question

In section 1.1. I posed the central question that I will answer in this thesis, whether information technology can bridge the gap between the citizen and law and reduce the resulting alienation that may cause erosion of legitimacy. That question is too broad to be answered straight forward. In order to allow me to find answers to this question. Part of the question is to conceptualise this broad territory in ways that reveal new areas for improvement. However, this obligation poses a problem. Certainly, one can hardly test all technologies and empirically ‘prove’ or falsify the contention that technology does or does not support legitimation. There is too much variety and not enough empirical data to falsify in that respect. However, one can investigate potential scenarios where technology does prove to be beneficial. The research question then evolves into an explorative investigation. The investigation addresses questions like: “Which technological aspects may help to support that legitimation?”. This is research about design (see figure 5 on page 23). The black-and-white position regarding the role of technology in relation to legitimacy now translates into a design problem of access, assessment, discourse and understanding of the issues involved during different phases of legislation. The research position thus shifts from a more absolute debate towards the perspective of an engineer using participative research methods to experiment with design solutions. Verbeek’s engagement with technology and ‘caring for the relation between humans and technology’ is operationalised in this research as a design question.
The design challenge that I will explore is: can 1) improved access to, and 2) user-centred case assessment and handling as well as 3) the increased participation in the development of regulations - support the legitimacy of the legal system in the sense of ‘Le contrat Social’ between government and the citizen?

Can access, case assessment service, better understanding and co-regulation be improved by better technological designs? What factors that can be supported by technology contribute to the legitimacy of law? The explorative nature of this research has consequences for the method. I will elaborate on the methodological aspects of this research later in this Chapter.
The question now is focused much more on the technology, but is still an open question with regards to the specific technologies that I’m interested in, and also the term legitimacy needs to be clarified in order to close the question and make it suited for being subjected to scientific research. Since I take a design perspective to the question whether technology will enhance legitimacy of law, I also have to be more precise on the kind of technologies that I will take into consideration. I furthermore will conceptualize the term legitimacy and last but not least I will decide on the application domain that will further narrow down the research question.
1.5.1 Technological issues and choices

The claim is that technology can support legitimacy of law. This claim raises questions about what is meant with ‘technology’ and how to deal with the rapid change in technological development. Below I describe some of the scoping issues with the claim and the choices that I made to set up the research.

Issue:
Technology is a very broad concept. It is impossible to investigate all technology, nor is that necessary.

Choice:
I limit the type of technology to digital (internet) technology. I look for digital information technology, not chemical engineering or genetic manipulation; At a later stage in the research I will focus more on specific types of digital technology within the experiments, such as digital maps.

Issue:
The state of the art in technology is rapidly changing. Technology and certainly digital technology is a moving target. Some technologies only became available during the research and the involved building crews did not have access to all technologies at all times. To maintain the claim that technology can support legitimacy one has to be clear about which technology was used at what point in time and substantiate that this technology was the state-of-the-art for the purpose at that time.

Choice:
The technology used for experiments was validated as state-of-the-art by expert opinions of technicians from more than six technology companies and several standardisation agencies involved in building the prototypes. These experts were selected in tender procedures by the Provinces of South Holland and Flevoland. The technicians and experts recognised the value of standardisation and architecture and were excited by the notion of a map-as-a-legal-infrastructure. Examples of such companies include Lost Boys, ISIS what is now Crotec. At a later stage we also included companies like Google, ESRI, Oracle, and public consultation technology experts such as Public-I in the UK and Etcetera BV in the Netherlands. Please note that Google Maps and TomTom were services that still had to be invented at that time! The concept of a legal infrastructure for the permit processing is now subject for the new Dutch ‘Omgevingswet’, but in those days few civil servants had an inkling of its meaning.

http://www.public-i.info/
Issue:
Digital technology often requires architecture and interoperability standards. Interoperability is defined by the European Commission as follows: *‘A set of standards and guidelines that describes the way in which organisations have agreed, or should agree to interact with each other’* (IDABC, Malotaux et al, 2007).

Interoperability is relevant in the light of the design of legal services as a delivery chain from production to policy enforcement. The availability of technology standards and semantic standards is relevant to enable the testing of the theory.

Choice:
The availability and take up of semantic portals and standards such as CEN Metalex\(^7\), OWL and IMRO (now called IMgeo2 by Geonovum\(^8\)) and thesauri like GEMET\(^9\) were influential upon the scoping for standardisation. I will elaborate on this in the next chapters.

Issue:
The technology has to be translated into operational software.

Choice:
There are pragmatic reasons to the use of certain software. Not all software was readily available for, or usable by the target group or in alignment with local government systems. The software used was limited to that the kind of software that could be used by government and government officials within a reasonable amount of time to create an infrastructure.

Issue:
The technology survey method in the ideal world would have been exhaustive. In the ideal world one might look at the problems and issues of problematic access to law and perform an extensive technology survey in order to match all available technical solution areas with the perceived design problems.

Choices made:
Those standards, at a later stage in the research, were based on smart algorithms and expert system technology, but an extensive worldwide search for a comprehensive inventory of all available technologies is not within the scope of this thesis. What will be described is more a sequence of events that led to a combination of two technological approaches that looked very promising (merging smart digitalisation of legal sources with digital map technologies). In this case, the technological survey includes ‘intuitive

\(^7\) [http://www.metalex.eu/](http://www.metalex.eu/)

\(^8\) [http://www.geonovum.nl/dossiers/BGTIMGeo](http://www.geonovum.nl/dossiers/BGTIMGeo)

leaps at the conceptual level’. The intuitive leap occurred while comparing the results in a text-based environment with those in a map-based environment when some of the potential of the new IMRO standard was recognised. The rationalisation of this leap occurred afterwards (Weick, 1975) and is partly based on perceived usability advantages and on the establishment of a descriptive standard for laws (CEN/Metalex10).

1.5.2. Conceptualization of Legitimacy

Beside the particular scoping of what I have chosen to be the interesting technologies relevant to my research question, I will also have to define more precisely what the term ‘legitimacy’ means in the context of this research. Literature shows that many scientists attribute different meanings to the term and I will have to define and use a conceptualization that matches the purpose of this thesis. Legitimacy is a broad term, covering a large range of concepts that differ in different cultures and in different contexts. The focus of this dissertation is on legal information provision and facilitating the fair balancing process as contribution to legitimacy rather than on the balancing of interests or the just application of norms itself. The focus is on legitimacy in the context of the application of technology. Thus, the discussion here is on institutions and their explanatory obligations where that technology plays a role. It is not about whether the decisions made are made correctly. Given the importance of the term in this research, I will elaborate on this central theme in detail in the next theoretical Chapter, Chapter [II]. Also, due to the difference between languages and cultures regarding legal terms, I have also included a glossary of terms and definitions in this dissertation11.

1.5.3. The application domain of this research

The legislation in this research is seen from a very specific perspective. The design perspective on legal information is a system perspective where legal sources - such as regulations, case law, doctrine and enforcement information - are seen as an information infrastructure, the design of which can be improved. The citizen, the civil servant or the business manager are seen as ‘users’ of a ‘legal servicing system’ (Breuker 1992, Winkels 1998). The focus is not on the regulations themselves, nor does the investigation address procedural matters or court cases. The legal information system or legal servicing system is not the same system as intended by the definition used by Valente: the social organisation, composed usually of sub-organisations, police, courts, governments, parliament, etc. (Valente, 1996, p. 40). Here, we address only the information roles of those organisations. During the course of the research, the focus on technology supporting legal services narrowed down to spatially related law. This focus came forth from the preliminary research, where business managers were looking for a permit to deploy business activities like LPG station 10. I will explain those standards at a later stage 11. A lexicon of terms is included in the appendix.
start-up or event organising. Spatially-related law in the Netherlands is particularly relevant for our research purposes because of the following circumstances:

- The Netherlands is one of the most densely populated countries in Europe with little surface to share;
- In spatial planning many interests have to be balanced;
- In spatial planning many legal regimes affect the same location (pluriformity);
- Both the court and the ‘plaintive’ have a formal explanatory duty;
- Businesses have a need for ‘case assessment’ to plan their actions;
- Public authorities need impact analyses of legislation;
- The acceptance and thus the legitimation is required for spatial planning;
- The existence of a special bill on the availability of legal information on real estate matters (Wet Puber: kenbaarheid publieke beperkingen onroerende goederen) illustrates a need in this sector;
- Spatial planning has characteristics of a ‘social contract’ or ‘socially constructed reality’ in the post-modernistic sense; this constructed reality requires public discourse.

Another reason to investigate the spatial area of law is that in the Netherlands, in 2010, the digital spatial plan became THE authentic legal source document. This was not a simple paper-to-computer change, because during the implementation process of DURP, the potential of new forms of digital support (ICT-semantic infrastructure that could enable a range of additional services to the citizens) appeared behind this shift\(^\text{12}\). This service infrastructure was realised in the standardisation committees of DURP\(^\text{13}\), but I doubt the members were aware of the significance of their huge design effort at the time. As mentioned in chapter [I], one of the driving forces behind the early digitalisation of spatial plans in the Netherlands was rather profane. In those days, spatial plans were supposed to last nine years. The frequent changes to the spatial plans (known under the name of: ‘article 19-modifications’, WRO\(^\text{14}\)) were often glued to the paper drawings using Pritt glue sticks. However, this glue dried out during the course of those nine years with as a result the adaptations to the plan ending at the bottom of dossier cabinets. This led to many embarrassing moments for the government officials when handling a case. Many hours were spent trying to analyse the changes made to the original spatial planning maps of the city by deducing alterations to the original plan from the marks of glue that still stuck to the paper, and which might match stray notes in the plan drawer. The form and location of the glue was the only help in the reconstruction of the legal history. Some officials could survive

\(^{12}\) See DURP, Digitale uitwisseling Ruimtelijke Processen, later developed into all spatial planning standardization and Geonovum: http://www.geonovum.nl/onderwerpen/ruimtelijke-ordening-standaarden

\(^{13}\) See the story of the 4’8 1/2 inch gauge, based on the roman cart, which is still the US standard, after its history as the coal mine cart standard that was based on Ox-pulling optimization (Carl Shapiro, 1999).

\(^{14}\) http://www.nwro.nl/?file=wet-ruimtelijke-ordening-wro
this situation. It was not unusual for government to receive financial claims, as they could not prove some legal history about a case beyond doubt (Gerry Fenten, programme manager DURP at the DURP Conference, Arnhem, 2004). Many of the insights of the DURP period are now used for the design of the Dutch Omgevingswet (integrated digital spatial law) that is planned to be in force in 2018 and claims to integrate 26 regulations into one new law. The Dutch government also claims to implement this law to improve services for the citizen (Minister Schultz in a letter to parliament, 2015). The significance of spatially related legal information and issues of digitalisation for the Netherlands is thus clear. The significance for other countries and other application domains has to be substantiated. The findings of the research will have to be generalised towards other countries and other application areas. I will address this issue in Chapter [XI] when I discuss the European developments on Environment, Health and Safety with the INSPIRE legal framework.

1.6. Research design, experimental set-up and methods used

As indicated in paragraph the above, one could identify more levels of legitimacy issues occurring from the relationship between citizens, business managers and government where this relationship is regulated (governed) by legislation. I have chosen three types of legitimacy problems where Technology could play a role to structure the issues:

1. Accessibility and knowability related to case assessment.
2. Legal effect planning and people’s understanding of the effect of regulations.
3. Improving public discourse to support balancing interests.

I will argue that the research requires an experimental approach. The design question has to be experimentally tested.

The aim of the technology design experiments is to test the effect of specific ICT designs, henceforth technology, on the stakeholders. In order to study the change in perception of the improved common situation definition and the support for harmonisation of plans of action, I conduct the experiments in representative cases. This should improve legal service for actors and legitimacy of law in three ways (knowability, cause- and effect and interests balancing as these terms will be defined in the next Chapter). I have limited the scope of the legislative body addressed in this research to the one that is concerned with the physical world, such as spatial regulations, environmental regulations and regulations dealing with themes like safety and health hazards. In Chapter [III], I will introduce a specific technology to deal with the challenges of the complexity of those physical regulations. This technology is GIS (Geographic Information Systems).

I designed the experiments first to compare map-based access to regulations with text-based access (or case assessment) to legal sources. The design hypothesis for experiment
[I] predicts, that a map-based access provides a much better foundation for case assessment than a text-based access. The initial findings have led to the formulation of two additional design hypotheses and conducting the experiments to test these additional research questions. These experiments are described in detail in chapters [III], [V] and [IX].

1.6.1. Constructivism as research design method

The technological solutions that are built as part of the three experiments described in the previous section will have different characterizations. The artefacts, i.e. the IT-solutions, as object are quite different in both functionality as well as in their technological construction. Also their context of use is significantly different. Studying these objects consequently require different research methods. In Chapters [III] and [VI], I will define the attributes of our object of design. These attributes are those aspects of the technology that, according to the theoretical design assumptions, contribute to legitimacy. These aspects of technology are then tested during the three experiments mentioned earlier.

The research objects in the three experimental settings are not already existing solutions, but are designed, build as well as implemented to facilitate the testing process. This constructivist approach, which is typical in information sciences, but rather unusual in the field of law, raises the level of complexity of the research. This cannot be avoided. The solutions, i.e. the research objects, are difficult to specify, as the users usually have different needs and objectives, and typically lack the knowledge and skills needed to articulate these, which makes it a typical information designer’s job to translate these needs in terms of legal information services to be provided by the potential solution.

Furthermore, besides these functional requirement related issues, we will have to decide on the issues related to technology that can help us realize that solution. This technical engineering aspect is also a challenge, because a priori few technologies are known to provide solutions for the problem and even fewer are tested in scientific experiments. Only after the solution is designed, build, implemented and tested we will know if the solution works!

To determine the research method, Horst Rittel provides a list of design attributes that remarkably overlap with the characteristics of our design object Rittel (1973). His list contains the following attributes:

- No clear problem definition
- Solution is not true or false, but good or bad
- No test for many possible solutions
- The design process is endless
- No rules available for guiding designers
- Each problem is unique
- Explanation of problems is subjective
- Little room for failure

Lawson labels such problems “wicked design problems” (Lawson, 1980).
“The search for scientific bases for confronting problems of social policy is bound to fail because of the nature of these problems...Policy problems cannot be definitively described. Moreover, in a pluralistic society there is nothing like the indisputable public good; there is no objective definition of equity; policies that respond to social problems cannot be meaningfully correct or false; and it makes no sense to talk about ‘optimal solutions’ to these problems...Even worse, there are no solutions in the sense of definitive answers” (Horst Rittel, Policy Sciences (1973), pp. 155-169).

An iterative approach to design

Given the articulation problems that may be expected in the three experimental settings, that include both functional as well as technical aspects of the artefacts to be realized, I have chosen an iterative design approach that could enable the adaptivity that would be required to meet the experimental demands. This included the design methods as well as the design team, that purposeful was organized as an ‘agile’ team. Our design object is a typical eGovernment service, and many examples have been described in literature, also stressing the importance of participatory design (see e.g. Bonacin, 2009, Constantin, 2003, Escalona, 2002). Such design approach typically is an ‘iterative design approach’ allowing for abundant user input, feedback and a multidisciplinary approach that, according to these authors, are essential as well as. In a design approach, especially that which is related to ICT design, the central positioning of the user has been a re-occurring theme. I will further elaborate on the issue in Chapter [III]:

- The iterative ‘agile’ design method is often contrasted with the waterfall methods where requirements are known. This method is often used when the specification of a system cannot be determined in advance (Alan Dix, 2004, p228)/

- Design methods are also differentiated in terms of process versus problem solving orientation (De Bruin, ten Heuvelhof and In ‘t Veld, 1998).

As a scientist responsible for constructing the research object as well as for the analysis of its merits to the problems at hand, I had to play two quite distinctive, yet complementary roles. Lawson points out to this interesting difference between “the scientist” and “the architect”. These distinctive roles are relevant to this research since we have introduced a better understanding of “technology” as a determining element. According to Lawson, while the scientist wants to know the rule behind the best design; the architect wants to find the design with the best results. We need to keep in mind that, although the

experiments will help to seek the best result, our goal is to find the rule behind it (Lawson, 1980, p.32).

I deduce from Lawson and Rittel that the design of a legal service using the Internet is wicked, requires an iterative ‘agile’ approach and justifies research into the rules behind the best solution and theory for evolutionary iterative design (Dix, 2004, p 243) This evolutionary prototyping approach is quite common in agile software development around games and open source software where users have a large say in the next steps (Sommerville, 1992). From a theoretical point of view, it could be interesting to observe the similarities in the ‘prototyping approach’ between the design of ICT systems used to build digital technologies and the design of regulative systems used to govern a societal domain. Fast iteration and co-creation are design methods that usually associated with ICT- methods and are rarely associated with the design of legislation.

Testing with simulation experiments in real world versus controlled lab conditions

One of the methodological questions is the decision whether to test the theory in lab-simulations or by means of questionnaires with actors inside the real decision making arena. In this research I have chosen to do both. The discussion on design methodologies points at the need to test the claim in real life experiments applying an iterative design approach. These experiments would have to be conducted with technologies using simulations of the legal case problems that the actors are trying to cope with. It is impossible to test all technologies and it is impossible to test with all actors. I have to investigate some of the consequences of these research decisions. As I will further explain in chapter [VII], there are a number of reasons to test the technology in experiments in a real-world environment rather than in a controlled lab situation. For clarification I will mention some of those reasons here:

- The balancing of interests of stakeholders requires real interests, which are hard to simulate in a lab situation
- The question of legitimacy is meaningless in a lab situation
- The stakeholders require technology that simulates their real-world problems in a recognisable way
- The government actors require technology that could actually be realised in their working environment, otherwise the experiment loses its value in their eyes

While testing the solutions in (near to) real experimental settings has certain advantages, there are also obvious disadvantages compared to lab experiments. Real world experiments are much harder to control and the creation of ‘Ceterus paribus’ conditions for the purpose falsification is hardly feasible. An additional problem is that government actors involved in the experiments are not always ‘independent observers’. They have an interest at stake and one has to assume that they will be biased towards anything that helps their cause.
They might also be biased against any technology that may threaten their cause.

Given the experimental nature of our solutions, the experimental setting, while being conducted in a close to real situation, had to be checked on the approximation of reality of the simulation. To check this ‘degree of reality’, a number of actions were planned.

We had to inquire about the perceived reality of the simulations from the actors. I also decided to interview the actors in a setting that was as close to the real legal deliberation circumstances as possible, both in time and in object of interest. Additionally, the research method would have to incorporate enough explanatory space for the actors to clarify their choices to check on any bias of these actors and the researcher.

The combination of the uncertainty we had about the functional and technological requirements and the possible technical solutions, given the experimental issues addressed before made me decide to organize the experiments as ‘living labs’ (see e.g. Leminen, Westerlund, & Nyström, 2012). This would allow us to explore the contribution of technology in the three experimental setting. It must be stressed that many technologies we needed still had to be engineered, something that can be excellently combined with other activities in such a living lab setting. Also the iterative design, build, implement and test cycle would fit this setting perfectly. I will elaborate on these research decisions in Chapter [VII].

1.7. Short introduction to the actual experiments

Within the living lab framework I conducted a series of experiments that I will briefly describe here to allow the reader to already get an impression of the research performed.

The first explorative Experiment [I] was the closest approximation of the real world as we could model in the technology platform. The experiment was prepared during several iterations using mock-ups of solutions to obtain extensive use-case scenario input. The goal here was to explore the service potential of maps in terms of access, case assessment and query articulation and retrieval. (See figure 5 on the next page.)

For the second structured experiment [II] we have chosen a simulation with less approximation of reality, but a highly structured technological and methodological approach. (See figure 6 on the next page.)

The technical goal here was to test the assumptions about the application of general open standards for geographic, semantic, and legal infrastructures. The methods chosen are a technical feasibility study and a formal usability test.

The design question for the experiment was to test the functionality of text-to-map. This is the operationalisation of the user-centred notion of “where-can-I-do-this?”, that combined geographical relevance and legal processing infrastructure.
As we will see, the support for the “where-can-I-do-this”-question implies an entirely modelled world with an infrastructure beneath it (Peters, 2009) whereas a “what-can-I-do-here”-question, at least from a technical point of view, requires a database field beneath a coordinate. The prototype was also used to formally measure the users preference for maps against textual representation of laws. The formal method applied measurements for time-to-result, and accuracy related to attribute variables of the user group.

The Human Computer Interaction method called SUMI\(^\text{16}\) was used in combination with a number of qualitative methods.

\textbf{The feasibility test in the third real-world experiment [III] combined real world scenario’s with infrastructure technology and political reality. For that reason I chose to test in a real-world situation. This decision implied building a technical and content infrastructure that matched and improved the one in use by the regional authority and its stakeholders.}

During the research for the third experiment a significant amount of time and effort has been spent to reach the level of trust required to obtain this “space” to work with real actors in real decision making situation about multi-million Euro interests which had to

\footnotesize{16 http://sumi.ucc.ie/}
be balanced. An important line of argument was the notion that the design “had to work” in the real world and the design theory had to be tested in the context of real world services with real stakeholders. Any simulations would have lessened the acceptance of proof as being a valid infrastructure design.

Figure 7: Third prototype for Experiment [III].

Otherwise, it would have been seen as “just a nice pilot idea”. In addition, no civil servant would really believe that any design solution, based on simulated research results, would ever work when stakeholders had real interests at stake.

The third prototype was designed to prove the applicability of technical concepts in a real life situation where business community and the public authorities try to balance different interests before the policy intentions are frozen into ‘legal concrete’. Whereas earlier attempts were designed from the perspective of the users (business managers doing case assessment), public authorities who facilitated the legal process were in need of a more maintainable method for flexible allocation of the permissions and prohibitions. The method for Experiment [III] is an operational feasibility study in combination with a range of methods that contribute to a living lab approach (Leminen, Westerlund, & Nyström, 2012). Pre-test technical validation was accomplished by performing feasibility tests. In addition, I performed a qualitative test among the focus group, with post-test validation in the follow-up activities of the actors and their peer groups, to implement the technology after the proof-of-concept. (Colson, 2012, p.241, p.158) and the results triangulation (Guion, Diehl & McDonald, 2011). I also kept an audit trail of meetings.
Ceveat emptor

In this introductional chapter I have explained how I came to the central theme of this research and how I transformed that question to an operationalized series of questions that will be answered by a combination of methods that are applied in three different living lab settings. I have also given some arguments for the choices made. These choices may also have some negative drawbacks that I will address briefly here.

During the course of the research I will investigate the perception of a limited number of actors about the claim that some technologies can contribute to three aspects or challenges that relate to legitimacy. These three challenges were identified as 1) accessibility and knowability, 2) case handling and legal effect planning and 3) co-regulation and discourse. I will not test this assumed relationship between those challenges and legitimacy.

I did measure the perception of the actors regarding the improved access, improved case handling and improved co-regulation and discourse. However, this is only an indirect measurement of legitimacy. I will address the challenges of measurement of technology-based contributions to legitimacy again in Chapter [XI].

The research addresses the digitalisation challenge of the domain of legal sources. As stated in the foreword of this dissertation, it should be clear that there is no intention to replace legal expertise with artificial intelligence. Nor is it an attempt to address the legal domain challenges themselves. First of all, this work is directed at a different problem area, which is the translation of the complexities involved with law and cases towards a ‘user’, especially if most of the interaction is handled by means of computer screens. Secondly, the technology may assist in supporting information processing and information retrieval regarding the cases, but it does not replace human decision making. And thirdly, if any attempt would be made to automate some parts of that decision making process, this would require a much deeper knowledge of the domain of law at hand and it would be a completely different type of research effort.

Interaction design versus technology

While investigating the value of technology for a given task, a distinction should be made between the concepts and the potential of technology on the one hand, and the specifics of human interfacing with that technology on the other hand. If one would want to prove the relevancy of electrical light, the quality of a lamp is probably relevant, but a badly designed lamp does not imply that electrical light is a bad idea.

During this research, a tremendous effort has been invested in the interaction design of the technology used in the experiments. It proved to be a challenge to distinguish between the technical potential and the interfacing in our case. Some interaction issues
and theories are explored further in Chapter [III] so as to distinguish between issues of interaction and issues of service design. This research avenue led to interaction theories like those of Gibson on affordances and of exploring the distinction between the map interface and the text interface for users. Interaction design of services is relevant to our research, since representation is a form of communication in the sense of Habermas.

The issue of relevant data or content

The available content became a major issue for two of the three experiments, since a minimum required degree of realism for the users turned out to be relevant for the feedback in the questionnaires. A number of issues became clearer during the preparation of the formal testing moments, including:

**interface**

- the usability of the interface should be kept maximally apart from the usability of the concept of maps.
- the availability of the content should be kept maximally apart from the usefulness of the system.

**legal culture**

- the Dutch culture is said to be legislative by character; we have often had critique in the sense that Greek decision making, for example, should be regarded as different from the Dutch one.

Testing outcome

Given some of the falsification issues, one has to ask what would happen if all results were negative. Would a negative outcome mean that technology does not support increase of legitimacy of legislation? This is not necessarily true. Such a result would only highlight that the chosen solutions for the actors involved in these experiments did not work. The representativeness of the group could be a variable influencing the outcome of the experiment, the chosen technology could be a variable as well. The real world experiment is always a simulation of reality but the quality of the approximation could be a variable as well.

On the other hand, if the results of the experiments would turn out to be positive, the same reasoning holds. I would then substantiate that a certain technology for a certain choice of actors did work out well. This raises the question what theoretical purpose is served by the research. A theory requires the notion of generalization from a single test case to statements about a wider domain. The falsification possibilities of this type of research appear to be limited. The theoretical gain would be to build on a design theory by testing an iterative design method in field experiments. This provides insight in how to create a simulation with a close approximation of reality:
Collecting relevant legal sources

Committing actors to the experiment that are representative for legal planning problems

Applying solutions in real conflict of interests

Apply technology that makes sense

Identify new areas of research regarding law and technology

Identify new research areas regarding legitimacy and technology

In Chapter [VII], the use case for experiment [III] is described in minute detail to provide an insight into the match between experiment and reality. The representativeness of the group and the use case is addressed with great care to enable other researchers to compare real world experimental settings. I consider this relevant because of the lack of empirical work in eParticipation research. A more theoretically interesting area of research would be that the iterative approach method that could support not only the design of technologies to support legitimacy, but also the design of legislative systems. This is the reason why the three layers of design were already mentioned in this chapter. In particular, those were:

I. The iterative design of the experiment
II. The iterative design of software systems
III. The iterative design of law

I will elaborate in chapter [X] and [XI].
Overview of the thesis chapters

To explore the research domain, I have decomposed the central theme and questions in several sub-questions:

- Legitimacy is a vague concept. What can we learn from earlier studies?
- Law is complex and harder to understand for citizens. The claim is that this may cause the erosion of the legitimacy of law. Technology is being used more and more in our legal system. What aspects of technology and design brings law closer to the public, thereby supporting legitimacy of law?
- The implementation of law is also a service for the citizen that is organised by government officials. The technology-enhanced version of these services are called eGovernment services. What can be found about those types of services?
- Knowing the law is not a new problem, nor is the application of technology, what history is available about those technologies?
- Digital maps seem to help with understanding many regulations for users, government officials and pressure groups. Which architecture, which infrastructure and which technology design could be offered best at what stage?
- Participation is a popular approach to increase legitimacy. The technology-enhanced version is called eParticipation. What empirical substantiation can be found for the contribution of eParticipation to legitimacy?

Unfortunately, also these questions cannot all be covered in depth in one dissertation. Many of these topics will be addressed to map the territory, however. The second Chapter starts with an in depth theoretical analyses of the legitimacy problem and houses most of the theoretical fundament this research is building on. The Chapter starts with a historical overview of technologies used to support accessibility, knowability, feasibility and participative policy making. This overview leads to a set of issues for the legislator that, if not well tended, could lead to loss of legitimacy. The Chapter continues with a number of perspectives on legitimacy and law. A set of three types of challenges for legitimacy are explained in more detail, and a number of theoretical views on items like implementation feasibility and user centred services and the tension between objectivity of a bureaucracy and alienation through digital depersonalised services are provided. This tension is a central theme throughout the thesis.

In Chapter [III], I start with an introduction of usability issues around legal services. This leads us to the application of map technology as a technological design approach to

17 Nemo censetur ignore legem (derived from Aristotle) is not a new theme
18 And it still is in recent debates: see the discussion about the Montessori democracy, chapter VI, (Tonkes, 2015)
accessibility and knowability of law. I will then describe the build of a first prototype and relate the testing of the experience with the users concerning the added value of maps for case assessment.

In chapter [IV], I will address the notion of infrastructure, architecture design principles and the notion of a legal service infrastructure. This Chapter covers the theoretical background of eGovernment service infrastructures. Given the doubts on the governmental production side of regulations, and from the legislators at the regional level, the design questions here are in fact feasibility questions. To answer these feasibility questions about legal service infrastructures, a theoretical side-step had to be made first. Since this research area is not so new in many other domains aside from Law, I considered it necessary to investigate existing research on eGovernment, infrastructures, architecture and interoperability first.

This leads to the second, more formalised experiment in chapter [V], where I improve the repeatability of the tests and consequently the strength of the research claim of increased communication discourse and therefore more legitimacy. I will then address the issues of formal testing methods for the acceptance and inhibitions of a digital map based systems for people coming from a tradition of paper methods for legal planning and case assessment. The process is described meticulously in order to inform the future debate on usability tests of legal software in general.

Chapter [VI] examines a range of theories on co-creation and co-regulation to support the feed-back from NGO representatives about the importance of joint interest balancing rather than ending up in legal polarisation. Co-regulation was a far away dream in 2005, when I started this research. Over the last 10 years, the use of technology has increased dramatically. The notion of the citizen co-designing legislation - which is intended as a very different notion from voting - using the App on his or her smartphone, has become much more realistic (Mulder, 2015).

I will argue in Chapter [II] and [VI] that if a design test should be made ‘realistic’, one should involve a use case that is governed by a real team of civil servant policy makers and experts who seek to support the political process as well as they can. Under those ‘real circumstances’, the use case has to be relevant for our theory ‘s validation, the interests at stake should be significant and the authority involved should be relevant. This theme is described in detail by Grimmelikhuijsen in his work about Trust. Grimmelikhuijsen addresses the concept of ‘vulnerability’ (Grimmelikhuijsen 2012, Page 36) in relation to experimentation and scientific methods regarding trust and information provision. The problem as defined by NGO-chairman Wouters indicated the need for a participative technology for co-regulation. The design solution of the legal service infrastructure as described earlier seems to fit those needs. To test this fit in a perception experiment carried out among real stakeholders, I will operationalise the theory and the ideas about policy making provided by regional authorities and moderators by turning those ideas into use case attributes for experiment [III].
Validation of the claim of enhanced legitimacy by co-regulation using technologies requires pragmatic feasibility tests.

In Chapter [XIII], the technical components will be described first, that together create the functionalities and the service infrastructure described in the former chapters. The ideas for solutions were partly based on Legal Atlas and the Dutch information model for Spatial planning (IMRO). Another part was based on over 10 years of research on the formatting of legal language in such a way that computers become a help, and from which Metalex and other legal source standards have emerged. Together they form a bridge between legal content, the physical world and the technical infrastructure.

Chapter [IX] provides the results of the actual field test with real decision makers in a real situation. The Chapter covers the outcome of each item in the questionnaire in minute detail.

In the conclusions presented in chapter [X] the question of legitimacy and law as described by Habermas is reviewed given the findings of the three experiments.

Chapter [XI] deals with the implications of the results and makes suggestions for future research work. The Chapter concludes with a number of concrete recommendations for eGovernment and law that were validated during discussions with a number of government officers.

The Appendix will offer a Glossary of terms to provide a more explicit definition space and parts of the questionaires used for operationalisation of the research.
II: Legitimacy, technology and Law
an exploration of the historical and theoretical foundations
“Whatever form law and legal procedure may come to assume under the impact of these various influences, it will be inevitable that, as a result of technical and economic developments, the legal ignorance of laymen will increase. The use of jurors and similar lay judges will not suffice to stop the continuous growth of technical elements in the law and hence thereof its character as a specialists’ domain. Nor can it prevent the spread of the notion that the law is a rational technical apparatus which is continually transformable in the light of expediential considerations (zwechrational) and devoid of sanctity or content.”

Jurgen Habermass
In this chapter, I will first outline some of the theoretical perspectives on legitimacy in general. Legitimacy is a complex term used in a number of sciences, including that of law. I have chosen the perspectives relevant for my research on technology and legislation. This research is in no way meant as a comprehensive study of legitimacy and law, as it would take an entirely different - and lengthy - investigation to cover the topic of legitimacy with any respect for its variance in meaning. Here we will restrict the search to those aspects that affect ‘Le contrat Social’ and could - in theory - be influenced by technology. I will then proceed with a short historical overview of technologies used to improve a number of aspects or challenges regarding legislation. This will lead to a clear definition of those aspects and identification of some problems when ICT is used to address these aspects. The chapter concludes with a literature overview regarding these challenges.

As stated in Chapter [I], I will use this definition of the Dutch National State council; ‘Legitimiteit geldt als een criterium voor het bestuurlijk handelen en kan omschreven worden als de maatschappelijke aanvaarding van dat handelen’. Translation: ‘Legitimacy counts as a criterion for all governmental actions and can be described as the societal acceptance of those actions’, (Dutch National Council of Public Administration, 1999, p.64). This definition comes closest to ‘Le Contrat Social’. In day-to-day speech the Dutch term for Societal acceptance is ‘Draagvlak’ which translates as ‘Public Support’ or ‘Basis’. This definition does not explicitly include the aspect of technology. I will now further explore definitions and theories about legitimacy to identify connections with the theme of technology.

Legitimacy as normative conviction

One of the perspectives on legitimacy is that of legitimacy as a normative conviction. This perspective is for example taken by Easton who defines legitimacy as ‘the belief that it is right and proper to accept and obey the authorities and to abide by the requirements of the regime’ (Easton 1975, P551). This approach to legitimacy puts the researcher in the perspective of people with the conviction that following the rules is necessary and that there is an abstract system called ‘a regime’ that produces the norms. However, it does not support reasoning in terms potential role of technology.

Another normative perspective relates to technology and addresses the need for access to intentions, rules and policies of government and the right of governments to access private information. Specifically, Deirdre Curtin emphasises the need to have access to shady corners of policymaking, like those that are related to intelligence work. Curtin has written a number of critical notes regarding transparency and legitimacy. Quoting article 15 FTEU(see below), she addresses the legitimacy question from the perspective of access to documents. Legitimacy as used in this context mostly refers to restricted information and government trying to protect the activities of secret agencies, however. ‘Any citizen of the Union, and any natural or legal person residing or having its registered office in a Member State, shall have a right of access to documents of the Union institutions, bodies, offices and agencies, whatever their medium, subject to the principles and the conditions to be defined in accordance with this paragraph. General principles and limits on grounds of public or private interest governing this right of access to documents shall be determined by the European Parliament and
the Council, by means of regulations, acting in accordance with the ordinary legislative procedure. Each institution, body, office or agency shall ensure that its proceedings are transparent and shall elaborate in its own Rules of Procedure specific provisions regarding access to its documents, in accordance with the regulations referred to in the second subparagraph. The Court of Justice of the European Union, the European Central Bank and the European Investment Bank shall be subject to this paragraph only when exercising their administrative tasks. The European Parliament and the Council shall ensure publication of the documents relating to the legislative procedures under the terms laid down by the regulations referred to in the second subparagraph’. (Article 15 of the Treaty of the functioning of The European Commission, FTEU as quoted by Curtin).

This perspective on legitimacy in relation to the use of technology may lead to tension between interests of the state versus interests of its citizens. This tension is clearly shown by the case of Julian Assange in the Wikileaks case and ‘Bits of Freedom’ both providing evidence that governments were tapping in our Facebook pages and filtering our mail without informing us. Government having the unlimited access to citizen’s private lives by means of technology may be relevant for the debate of technology as a threat to legitimacy. I mention this perspective because the heated debate and the role of technology (hacking your phone) could be seen as fuelling the position of Marcuse and other critics of technology. Balancing the interest of citizens and the public interests is not an easy task when deciding on the power we should give to the secret police seeking terrorists. Governments seem to resort to extreme measures in sight of extreme opponents, like terrorists, but this is outside the scope of this thesis research.

That application of technology may put tension on the relationship between citizens and the state is obvious, but in this thesis we will focus on the much more mundane problem that started the research in the first place: could technology help the business manager to find solutions for his business problems with respect to legislation?

**Legitimacy and technology in research literature**

There is a great deal of scholarly work on transparency that is mixed with the questions of legitimacy which might bring us closer to legal issues and technology (Grimmelikhuijsen, 2012). I will not address issues of court judgement, case law and the context of the legalistic application of norms itself. Rather, I will focus on the legislative production process and the transparency of the relevant information. Stephen Weatherford does bring us a step closer to the aspects of legitimacy that can be operationalised in concrete terms and in technological applications that are closer to the research objective (Weatherford, 1992). Weatherford identifies the four properties of legitimate systems as:

- **Accountability, which relates to our concepts of access and knowability**
- **Efficiency, which relates to the notion of a service and costs**
- **Procedural fairness, which relates to knowability**
- **Distributive fairness, which relates to the fair balancing of interests**
Weatherford (1992) recognizes the notion of a system as a whole that requires legitimization work. The aspect of accountability can be seen as transparency and access, as in the theories mentioned above. However, legitimacy is also described in terms of an abstract system that should adhere to qualifications as ‘efficient’ and ‘procedural fair’. Legitimacy, as viewed by Weatherford represents a viewpoint that regards the government regulatory system as procedural fair when regulations are applied to cases. The ‘fairness’ is introduced suggesting it is an impersonal characteristic of the structure, rather than the judgment made by a person. This ‘fairness’ in the context of de-personalisation is defined as a side effect of bureaucratic systems. It is also one of the re-occurring themes when ICT technologies are used by government. The property ‘distributive fairness’ as mentioned by Weatherford (1992) points at the need to fairly balance interests of actors in society. His mentioning ‘efficiency’ in the context of legitimacy is interesting. The notion of an efficient government implies that governments can also be inefficient, which can be interpreted as unwise spending of tax payer’s money. Weatherford claims that there is a relationship between the actor’s perception of efficient government and legitimation of government. I have only found this relation as expressed by government officers and politicians, but have not found any evidence of this relation when citizens or business managers were concerned in relation to their own use case.

Weber already stated that bureaucracies are superior – and therefore legitimized – because of the ‘craftsmanship’ involved in process efficiency in the face of ‘then modern’ technology and logistic challenges (Weber, 1921, p. 128). The paradigm of an efficient and cost effective government turns out to be one of the main drives of ICT technologies used by government (eGovernment) in recent years. The relationship with legitimacy is at least a subject of discussion, as I will describe further in this chapter and in Chapter [IV]. Weatherford, although his arguments seem in line with our search for aspects of legitimacy that can be supported by technology, seems to position legitimacy more in the political arena of a representative democracy rather than the administrative world in which the state’s institutions operate and that are supposed to provide a certain level of services to citizens. Bovens and Zouridis provide a strong case for system level transparency in their article about system level bureaucracies and the Digital Legal State (Bovens 2000). Bovens and Zouridis contributions starts with the observation that Nobel prize winner Hayek was too pessimistic in his fear for the loss of freedom: [...] “Hayeks onheilsboodschap dat de komst van de verzorgingsstaat met zijn uitkeringen en subsidies, vergunningen en beschikkingen, discretionaire bevoegdheden en loketbeambten, onherroepelijk zou leiden tot een Road to Serfdom (Hayek, 1944; 1960) is daardoor een zichzelf ontkennende voorspelling gebleken. Rechtsstaat en verzorgingsstaat bleken uiteindelijk met elkaar verenigbaar. Translation: Hayek ’s message of unavoidable doom, that the welfare state with its benefits and its subsidies and regulations, permits and discretionary power would inevitably lead to the road to serfdom has proved itself to be a false prediction. The Rule of Law and the welfare state turned out to be compatible” [...] However, Boven’s line of argumentation is that the shift to an information society is perhaps much more threatening to this ‘freedom’ than the top-down welfare state ever was: [...] “in plaats van rumoerige, onoverzichtelijke beschikkingenfabrieken met lastig te controleren uitvoeringsambtenaren,
Legitimacy and trust

Legitimacy and trust are to some extend connected concepts. Different scholars have argued for example, that citizens tend to comply more frequently with its demands, laws and regulations without coercion provided that they regard the government as trustworthy (Ayres and Braithwaite, 1992; Chanley et al, 2000; Lev and Stoker, 2000, cited in Grimmelikhuijsen, 2012). Grimmelikhuijsen provides a relevant overview in his work on transparency and trust. The difference between legitimacy and trust may require some special thought. Both terms are used in public debate with different connotations. Both terms seem to be used to describe the strength of the covenant between citizen and its government to obey the rules, but trust is used in a wider context than legitimacy. Trust is also used towards specific people in government or while discussing the whole societal system of power distribution (Grimmelikhuijsen, 2012, p.28).

Figure 1: trust and legitimacy in broad-narrow relationship.
Legitimacy is sometimes used in a narrow sense, where it defines the legal base of administrative actions.

I will use the term legitimacy in a somewhat broader sense, i.e. as the societal acceptance of the government, how it shapes its legislation, organizes its policy-making process, how it implements its policy, designs its operational processes and decision-making processes (see figure 1 on the previous page). The transparency of all these processes is seen as an important factor of this legitimacy. Both the narrow as well as the broader concept of legitimacy contribute to trust. Transparency can relate various domains, from television as a means for manipulation (Marcuse 1965, Chomsky 2008, see Chapter [I]), to policy-making processes and formal access rights for decision-making processes.

Grimmelikhuijsen (2012) uses the term ‘trust’ where he is describing the formalised relation regarding policy making and policy effect and specifies the role of information sharing during these formal processes. Grimmelikhuijsen quotes Shapiro stating that there are many definitions of trust (p. 29), but the same can be said about legitimacy. Grimmelikhuijsen points at the legalistic character of ‘legitimacy’ based on definitions of Curtin and Meyer, where I would set the distinction in the formal relationship between legitimacy and trust at the formalised relationship as well, but I would also include the legislative design processes and the administrative implementation processes. Grimmelikhuijsen does take a system view towards the notion of user-centred design and government information services: ‘There is substantial work that underlines the notion of transparency not in the sense as ‘information push’ by government, but as a service that is usable and comprehensible to the public’ (Grimmelikhuijsen, 2012, p. 66).
Table 1: overview of policy phases and transparency, (by Grimmelikhuijsen, 2012 p.66).

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Transparency completeness</th>
<th>in relation colouring</th>
<th>to Trust usability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision making</td>
<td>Complete information (e.g. elaborations and rationale behind decisions) about the decision-making process is available</td>
<td>Information is reflecting all values and opinions in the process</td>
<td>Decision making process made insightful in a timely and understandable manner</td>
</tr>
<tr>
<td>Policy formulation</td>
<td>All relevant policy plans and measures are available</td>
<td>Reflecting both positive and negative issues about the policy</td>
<td>Policy plans and measures are made insightful in a timely and understandable manner</td>
</tr>
<tr>
<td>Policy outcome</td>
<td>All qualitative and quantitative data about relevant policy outcomes are available</td>
<td>Effects are determined objectively, there is room for dissenting opinions about policy outcome</td>
<td>Policy outcomes are made insightful in a timely and understandable manner</td>
</tr>
</tbody>
</table>

When questioning the relation between transparency and trust, Grimmelikhuijsen quotes Bovens and other researchers, since transparency can also lead to ‘a culture of blaming government’ (Grimmelikhuijsen, 2012, p. 20). Grimmelikhuijsen provides an aggregation of theories on different aspects of transparency and trust at different stages in policymaking (see table 1 above). He does not explicitly include the legislative process whereas – for our intentions at least – this aspect should be added as a research object, because the problem that LPG business manager faces in our example use-case follows from decisions made in the legislative process. Scholars such as Grimmelikhuijsen have connected legitimacy, law and technology. However, empirical research on the relation between legitimacy, law and technology is rather scarce. Grimsley and Meehan are one of the exceptions and address the concept of trust and refer to the earlier work of Braithwite and Levy, who distinguish between vertical trust towards governmental institutions and horizontal trust among members of a family (Braithwite, 1998 in Grimsley et al, 2003, 2008). The interesting part is that Grimsley and co-authors conducted a number of large surveys about the relation between trust in government institutions and government services in 2000 and 2001 and 2008. The aspects ‘being well informed’ and ‘being in control’ (defined as perceived enlarged opportunity space) and ‘being capable of acting upon the information’ were found to positively correlate.
with trust in government services. These findings were then extrapolated for the evaluation of eGovernment services in their later work. *Turning to measures of outcome as drivers of trust and recommendation, we see that the extent to which they have become more knowledgeable about housing in general is significant in both cases. The degree to which people feel that they understand why others are allocated a property when they are not has a very appreciable impact on reported trust change* (Grimsley and Meehan, 2008). Grimsley investigates the extent to which better technology design could support trust in certain government services. His operationalization of trust was 1) ‘understanding why a similar case got the ruling it had received and 2) recommending the electronic service to others. I will elaborate on this aspect in Chapter [VI], where it feeds into Experiment [III]. Kordelaar (1992) describes the risk of losing legitimacy when the legal drafting process is lacking consistency and completeness. She applies technology (the expertize software) to detect those defects and argues that releasing the legislation without corrective measures could cause a decrease of the acceptance of the rule, in this case the social support act (bijstandswet). Sharpf makes the distinction between ‘input legitimacy’ and ‘output legitimacy’. Input legitimacy relies on the participation and consensus by people. It is attained by people who reach a decision. Output legitimacy is derived from the capacity of the government to solve problems that requires collective solutions (Sharpf (1999) as cited by Grimmelikhuijsen (2012).

**Figure 2: staging model derived from Sharpf.**

As stated in figure 2 (see above), Sharpf already helps us to recognise the output side which seems related to the implementation aspects of legislation and explanation, since
this study addresses the collective side versus the individual side. Both Grimmelikhuijsen (2012) and Sharpf (1999) use a staging model. As we will see in Chapter [VII], there is more evidence in research that hints at a staging involved in questions concerning the loss of legitimacy.

This staging will help to clarify some findings of my research. In fact I will show that some of the problems of legitimacy can be avoided by reaching consensus before ending up in court fights. I will refer to this important dimension of legitimacy later in the text.

Findings legitimacy and the potential role of technologies

From Wheatherford, Grimmelikhuijsen, Sharpf, Raz, the Dutch Legal Council and others, we derive the following:

- The Legitimacy concerns the societal acceptance of government actions;
- There is a formalised, objective system of government based on measures and rules;
- Interests have to be balanced among different actors, i.e. distributed fairness (Wheatherford);
- Decrease of acceptance of law could lead to additional investments of governments to prevent citizens losing their commitment to obey law which I defined as ‘legitimacy costs’;
- There is a risk of government-blaming to transparency, which could also be called ‘legitimacy costs’ because of the additional investments of government to repair the damage;
- Explanation is a vital part of legitimacy;
- There is a staging model where different technologies could have different impacts;
- There is an input phase to a policy that requires an acceptable level of consensus;
- There is an implementation phase were policies are redesigned into executional measures, norms and regulations;
- There is an objective or effect of a policy that requires explanation and there is evidence that explaining these objectives supports trust;
- The policy making process and the decision process and the solution design process have to be done in a cost effective manner;
- Many of the aspects mentioned in the list above could in theory be supported by information technology
- Earlier empirical research regarding technology support demonstrates that technology can help to improve trust (Grimsley) and that creating such technologies may help to improve legislation (Kordelaar).

Following Bovens, Grimmelikhuijsen, Sharpf and The Dutch legal council and Raz, I will address the consensus building not as a political process, but as an information challenge about regulations, policies and the balancing of interests. The contents of the policy debate and its effect on specific cases are not the object of the present research. Rather,
the object of the research is the role of technologies in making the contents of this debate more explicit and more understandable. I have added the legislative aspect and stages to the model. The legitimacy issue here – in addition to the challenges of knowability – is during the policy formulation process; Are actors capable of understanding each other’s intentions and interests? Are the stakeholders correctly informed about the balancing act of those intentions and interests? Is the resulting legal playing field consistent with the outcome of the balancing? The fact that Grimmelikhuijsen and others specifically address the information provision side of policy making is indicative of the role of information and communication technologies (ICT). The theoretical models of legitimacy, trust and transparency can help to identify the areas where ICT technologies could play a role. A theoretical approach to the theme of information provision about policies and legislation and its significance for legitimacy will now be continued with a short historical overview.

**Historical overview of technologies and law: introduction**

In the historical overview I will briefly cover some of the developments in the relation between technology and legislation that affect legitimacy. These developments start with issues of accessibility (History A) of legislation as a relatively simple barrier. The People cannot adhere to regulations they know nothing about. Legitimacy was at least a matter of having access to legal sources. At a later stage, legitimacy was still a matter of accessibility, but it changed into the capability of handling large quantities of legislation or case law. The challenge of handling complexity and quantity led to the first attempts to apply computer technology in order to automate parts of the regulative process. If citizens experience obvious mistakes in the case handling and if they cannot understand the match between the rule and their specific case, they will start doubting the government and its right to impose legislation. When society became more complex, the knowability challenge migrated towards use case context and societal context (History B). The government is supposed to know its own policies and rules, as well as the effect of the case of the citizen within a complex system of regulations. Those regulations are pluriform and multi sector: they are defined by local authorities, provincial authorities, national authorities and the European Commission. In the following stage the citizen started to be seen as a ‘user’ of a government service. Internet technology had become a main stream facility that was mature enough to use its benefits in tackling problems of accessibility and knowability. The legitimacy technical challenge evolved towards ‘user centeredness’, efficiency in case handling, legal planning, and enforcement issues.

The latest development in the relationship between legitimacy and technology was influenced by the notion of self-regulation, co-regulation and decentralisation. In view of the use of ‘Apps’ and social media, one can envision a shift in responsibilities from central government towards those citizens and local agencies. Technology-enabled transparency has become a main driver of change, but it could also become a threat to legitimacy in a blaming culture (Grimmelikhuijsen, 2012 p.29). This is the technical challenge of legitimacy and discourse and co-regulation (History C). Throughout the historical overview technology evolves as the enabler of the governing agency, supporting legitimacy, but it could also
become a threat or a problem space that backfires against that government.

**History A:**

*Accessibility and accountability in the beginning of Europe*

The challenge of rulers to make their rulings known among the public is not new. Most legal procedures were testimonial procedures heavily relying on customs and oral deliberations. This could become troublesome when the numbers of ruled people tended to increase in size. One had to discover new technologies to provide access to the rules. One of the first known ‘legal information infrastructures’ in the West was made of stones and was called ‘Stelae’ (In China one used Bamboo slips during the Xia Dynasty in that time). Among the first known written laws were the Babylonian Emperor Hammurabi code containing 282 laws encrypted on ‘Stelae’\(^19\), standing stones or on clay tablets in 1772 BC. After the consolidation of law into the ‘Corpus Juris Civilis’\(^20\) of Roman Emperor Justitiani in 534 and the Theodosian code in 439 from Constantinople it became very quiet as far as written law was concerned. Charlemagne or Charles the Great (742) had a centralised court. It is said that Charles had to spend a half of his life on horseback to bring his rule literally to the corners of his empire (Turner, translated from Einhard, 1880). Only after the recovery of

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\(^{20}\) Diorite Steleae with Hammurabi code (including the infamous ‘an eye for and eye’ rule
the Corpus Juris Civilis by the crusaders and the Renaissance studies on the Pandectae at the University of Bologna the written legislation regained its influence again in Western Europe (Glenn, 2000). Apart from the differences in civil law versus common law, there has always been a more pragmatic issue of making the rule of law known to those who had to carry out the instructions and those who had to follow those rules.

From the middle ages forward

Well-known legal statements in history, like the Magna Charta in 1215 and Luther’s 95 statements hammered against the door of the Wittenberg’s church (1517) were perhaps also famous for the way and the setting in which they were ‘published’. In the Middle Ages authorities appointed a ‘Herald’ to run around and announce important news and rules. The problem of accessibility was a two-direction issue: in the Magna Carta, there is a statement about establishing court in one, fixed place, to avoid an increasingly difficult situation of a desperate chase for the traveling King’s court for everyone seeking his Majesty’s justice: ‘Ordinary lawsuits shall not follow the royal court around, but shall be held in a fixed place’. (Magna Carta, Chapter 17, British Library).

![Figure 5: Magna Carta, 1215.](http://www.sduuitgevers.nl/nl/content/corporate-geschiedenis-sdu-uitgevers)

In the meantime the technology had evolved from goose-feather-and-ink to print. William of Orange made sure he had a printing facility at his disposal to print his edicts while being at the start of the 80-year war with the Spanish suppressor. (Willem Silvius, drucker der Coninccklijke Maijesteit, 1577)\(^1\). In the next years the printing of legislation became so common and happened in so many places, that the technology ran against its limits. The body of law became quite substantial in common law. The Year Books were the

\(^{21}\) [http://www.sduuitgevers.nl/nl/content/corporate-geschiedenis-sdu-uitgevers](http://www.sduuitgevers.nl/nl/content/corporate-geschiedenis-sdu-uitgevers)
law reports of medieval England. The earliest examples date back to 1268, and the last in the printed series are from the year 1535. The ‘Year Books’ are the UK principal source materials for the development of legal doctrines, concepts, and methods from 1290 to 1535, a period during which the common law developed into recognizable form. More than 22,000 individual reports or ‘pleas’ have been printed, while others remained in manuscript (David J. Seipp, 2012).

The sheer magnitude of the body of law became a problem. This is the problem of accessibility related to quantity. In the 1970s and 1980s, the magnitude of the body of legal sources was aided by the first attempts at automation to handle the scale of case handling processing (e.g., see the European Commission ‘TEDIS’ programme about EDI and law and many issues of the ‘Computers and law’ journal in the late 1980s). There were some optimistic views on what computers could handle when the processing of administrative tasks was concerned and politicians demanded regulations with many variables, exceptions and appeal possibilities.

**History B:**

**Case handling and the design of formalised objectivity**

Gottfried Leibniz was among the first to apply impersonal logic to define a common scientific ground for legal reasoning. He had been trying to discover universal mechanisms behind several societal challenges, including law. As a political advisor to several high-ranking European leaders of his time, he was deeply involved in matters of politics, but, at the same time, he was one of the few European thinkers who contributed to the base for the enlightened Europe, that is; a Europe build on rational thought. Leibniz tried to enable the calculation of law and designed what could be called the first computer to support calculation: the *Calculus Ratiocinator*. One of his goals was to make legal reasoning independent of people, thereby introducing objectivity, legal equality and consistency. Another goal of his was to replace reasoning by automation. This could be seen as an early attempt at expert system support for legal argumentation. At that time it was revolutionary to envision law independent of personal or divine judgements. Once law was made known and objectively

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**Figure 6: Leibnitz’s attempt at a calculus Ratiocinator.**

Here you see a replica of the ‘Stepped reckoner’, app. 1672.

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[22](http://www.eumonitor.nl/9353000/1/jg5v7m1c3gyxp/vi8rmzwk5rz4)
formalised, another challenge arose; the issue of feasibility. The relationship between legit-
imacy and feasibility and implementation gradually evolved from problems and mistakes with
execution of regulations in case handling, but only in ‘modern’ times such considerations
of feasibility were considered meaningful. In the earlier days, the rule of law was dictated
by power and those who tried to counter the power by using the rules against that authority,
usually ended up with either their heads chopped off, or with escaping those authorities in a
wooden box (Oldenbarneveldt and Hugo Groot are famous Dutch examples of this struggle).
Feasibility was a matter of simple and brutal enforcement. If a law did not work or was not
obeyed, one simply sent some forces to the location in question and set matters straight. Inca
law is a good example of ancient society based on very simple laws, but brutally enforced in a
manner that was clear to all citizens. All ‘criminals’ had to publicly state their crimes against
the law for every person passing by at the city gates. Rules were simple and direct: “Ama
suwa, ama llulla, ama quella’: ‘Do not steal, Do not lie and Do not be lazy” Feasibility and
implementation were seen as a challenge of logistics, obedience and the amount of forces
one could send to remote or powerful locations.

Twentieth Century

In more modern and complex times, feasibility has more to do with administrative
organization, efficiency and effectivity than with power. Here, questions have been raised
about the effects of law, like the inquiry whether the legislation was in fact resulting in the
desired effect. Other questions have been related to the manner in which the other existing
regulations and the related government agencies would be affected. Impact, feasibility and
enforceability have become relevant questions in a bureaucratic sense of Weber (1921). The
legislator had to think in terms of the implications of regulations in a complex environment.
The question of obedience as part of implementation and feasibility has changed into a ques-
tion of managing constraints. Citizens could now challenge legislation by pointing out ‘collate-
ral damage’. Regulations have gradually become to be seen as part of an environmental and
societal context and a use case affected that context. In article 9 BRO (Law on Spatial plans)
of 1985, the feasibility test have become an accepted part of the law itself:

[...] “Burgemeester en wethouders verrichten ten behoeve van de toekomstige ruimtelijke ontwik-
keling van het gebied der gemeente onderzoek naar de bestaande toestand in en naar de moge-
lijke en wenselijke ontwikkeling van de gemeente. Bij de voorbereiding van een ontwerp voor een
bestemmingsplan heeft het in het eerste lid bedoelde onderzoek van stonde af aan mede betrekking
op de uitvoerbaarheid van het plan [...] Translation: [...] “The City Council will investigate the
existing status and future developments of the municipality area in order to plan future Spatial
developments. During the preparation of a new spatial plan, this investigation will incorporate
the aspect of feasibility right from the start of the proceedings.” [...]
Somewhat later, the notion of ‘costs of legal implications’ and the term ‘administrative burden’ for businesses became relevant (Arendsen, 2004, 2009). In Europe and in the Netherlands a number of action plans were initiated to decrease this ‘burden’ and to try and make the rule of law more feasible and less cumbersome. Part of that discussion was dedicated to the endless struggle to diminish the quantity of regulations. This struggle has been and still is a failure and it is interesting to observe the ways in which the Dutch government tries to steer away from this approach and its disappointing focus on ‘reducing the burden’. I do not support the position that lessening the so-called ‘administrative burden’ would or would not increase legitimacy. I have not investigated such a claim. It is more interesting for this research to observe that ICT technologies are perceived as the main driving force behind the organisational improvements or this reduction of ‘administrative burden’. I also note that this particular view marks the start of a rather new development regarding the position of a user of law. The concept of administrative burden involves the perception of someone who is affected by the legislation; i.e. the one who is ‘burdened’. This burden is not related to the legal content of the legislation but to the administrative process involved with compliance.

The affected party, or the ‘user’ of legislation, has entered the equation. In earlier times the affected party was seen as those who had to be ruled by legislation. Le contrat social seemed to have gotten an additional dimension. Nowadays ‘they’ became entitled to a more user-centred approach and design. In 1973, the Dutch tax office launched the well-known statement in a TV commercial: ‘Leuker kunnen we het niet maken, wel gemakkelijker!’ “We can’t make it more fun, but we can make it easier!” The tax-office was one of the first Dutch governmental agencies whose policies evolved from the top-down executional perspective towards the bottom-up end user perspective. The unidirectional orientation has become a dialogue. This shift may have originated from government agencies seeking for the ways to make their clients behave efficiently rather than from the conviction that citizens should be treated as clients. (Hoogwout, 2010, p.57). Nevertheless, it cannot be denied that these citizens became more important as user of a government bureaucracy. This was also the time of New Public Management in the US: ‘meet the needs of the customer, not the bureaucracy’ (Osborne and Gaebler, 1992). The citizen in his relation to government was now compared to a ‘customer’ of services. In 1991 Hirsch Balin, the then acting Dutch Minister of Justice, writes a report ‘Zicht op wetgeving’ (translates as ‘Perspectives on law making’) that is generally seen as the start for a more externally directed focus on the production process of legislation. Before this period, legislative processes were defined more by internal dynamics of the government. In this open and candid report, which was...

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25 European Commission Com 275, 2002
26 ICTAL programme: https://www.parlementairemonitor.nl/9355000/1/j9yivjsepmj1eyo/vij3ansvn1ique ACTAL programme: http://www.actal.nl/ 2013
27 http://www.rijksoverheid.nl/documenten-en-publicaties/kamerstukken/2013/05/17/beantwoording-kamervragen-over-toenemende-aantal-regels.html
28 http://www.beeldengeluid.nl/leuker-kunnen-we-het-niet-maken-wel-makkelijker
29 http://www.kppc.nl/images/stories/documenten/Nota%20Zicht%20oop%20wetgeving.pdf, translates as ‘views on litigation or law making’
accepted at Dutch Parliament, he states that government has the duty to understand society on which it inflicts its regulations in order to be just, more effective and more efficient. He literally states that ‘government had relied too much on the notion that society would change according to the regulations, after those were written’. (Balin, 1991, p.11).

A number of quality criteria were mentioned for the first time at this level:

- Rechtmatigheid en verwerkeling rechtsbeginselen (Legality)
- Doeltreffendheid en doelmatigheid (Effectivity and efficiency)
- Subsidiariteit en evenredigheid (Subsidiarity and proportionality)
- Uitvoerbaarheid en Handhaafbaarheid (Feasibility and enforceability)
- Onderlinge afstemming (Mutual alignment)
- Eenvoud, duidelijkheid en toegankelijkheid (Simplicity, clarity and accessibility)

It is interesting to note that, back in 1991, this report already mentions ICT as an important asset and as a potential problem. […] “De ervaringen met de invoering van de Wet op de studiefinanciering hebben geleerd hoe onmisbaar deze afstemming is. Onvoldoende inhoudelijke en procedurele afstemming tussen wet en de benodigde informatiesystemen is in toenemende mate een belangrijke faalfactor bij het wetgeven en de daarmee beoogde beleidsvoering’. Translation: […] The recent experiences with the implementation of the academic study-scholarship directive have proven the significance of coordination of ICT and the laws these instruments are supposed to help implement. Insufficient content based alignment and procedural alignment of law and the required information systems are increasingly becoming a risk factor during the legislative processes and policy execution.” […]

For this research it is relevant to observe that as the cause for new strategies regarding feasibility, Hirsch Balin (1991) mentions the example of the failed implementation of the law on financial support for students (studiefinanciering). For the first time the combination of mass (case) processing, automation and the complexity during the implementation phase of a policy resulted in such a number of mistakes and complaints (at its peak, the implementation agency had a case load of 210,000 unopened letters with pleas for administrative help), that the legitimacy of the system was threatened (Bovens 2000). Feasibility of legislation became an explicit target during the policy design stage and ICT technology became an acknowledged instrument for legal information provision and case processing. However, ICT technology causes also an acknowledged (alignment) headache. The relevance of ICT for the increase of efficiency and feasibility of legislation in the implementation phase was also discovered during the tax administration reforms in the 80s. These were among the first Dutch examples of ICT used for the support of the implementation phase of rules, in this case tax regulations (Boer and van Engers, 2003). Van Engers and Boer provide another,

30 The first widely used internet browser, Mosaic, was only launched in 1993
31 http://retro.nrc.nl/W2/Lab/Profiel/Studiekeuze2000/ib.html
more cyclic view on input and output regarding legislation. They argue that the increasing rate of change that influences the administration also demands a more agile approach to the policymaking process, from the viewpoint of implementation agencies and from the viewpoint of the operational case handling. (van Engers and Boer, 2010, see Chapter [IV]). Their model includes both a phasing and an input, design and output cycle. Technology would become an instrument to improve consistency between legal drafters and the implementation stage.

In 1994, ‘the feasibility and enforceability test’ (uitvoerbaarheid en handhaafbaarheidstoets of U&H toets) was introduced by the Justice Department.

In 1996 this was broadened towards all Dutch Ministries. [...] “De Uitvoerbaarheid- en handhaafbaarheidstoets (U en H toets) is een instrument om een zo goed mogelijke inschatting te maken van de effecten van een ontwerpregeling voor organisaties die deze zullen uitvoeren en handhaven, bijvoorbeeld uitvoeringsorganen, inspecties, bijzondere opsporingsdiensten, OM of rechterlijke macht. Op basis van de in kaart gebrachte effecten kan bijvoorbeeld een inschatting worden gemaakt van de in te zetten handhavingscapaciteit. Inzicht in effecten op het gebied van U en H kan bovendien bijdragen aan een evenwichtige politieke besluitvorming. De U en H toets maakt onderdeel uit van de toets Effectbeoordeling voorgenomen regelgeving.” [...] Translation: [...] “The feasibility- and enforceability test is an instrument to make an estimate about the effects of a concept-regulation for those agencies that will be responsible for the implementation, the enforcement of the regulation, such as inspection agencies, enforcement agencies, investigation agencies or legal agencies. Based on the effects, an estimate can be made of the required enforcement capacity. Insight into the effects on feasibility or enforcement may also be of influence on a balanced decision making process. The feasibility and enforcement test is part of the test effects determination.”

In 1998, the Dutch OL2000 programme (‘government service desk 2000’) intended to create the one-stop-shop government super-website as an embodiment of the user-centred approach (M. Poelmans, Zouridis, 2000, van Duivenbode, 1999, Hoogwout, 2010). This was already in the time of the internet, of course, and that new global ICT infrastructure had a huge impact on government services. The realisation that websites were only a front end and required a ‘back office’ with connected databases slowly gained more support (nowadays we would speak of connected webservices).

In 2009, the LEGIS programme introduced the term ‘legal architecture’. This programme introduced by the Ministry of Justice aimed at reducing administrative burden and increasing efficiency, but the emphasis was on the improved design of legislation. ‘Goed’ betekent dat bijvoorbeeld wordt voldaan aan kwaliteitseisen als effectiviteit en doelmatigheid, uitvoerbaarheid en handhaafbaarheid: het ‘gemak’ waarmee regels uit te voeren en na te leven zijn, bepaalt het effect ervan. Daarnaast is legitimiteit een belangrijk aspect: regels die ‘gedragen’ worden, zowel binnen de overheidsorganisatie als bij de burger, zullen meer effect sorteren. De mate van transparantie en participatiemogelijkheden in het wetgevingsproces bepalen mede de legitimiteit (Programmaplan LEGIS, 2009). This translates as: [...] “Well designed means that legislation complies with quality norms like effectivity and efficiency, enforceability: the ease in which the legislation is implementable defines the effect’. Aside from that legitimacy is an important...
aspect: regulations that are accepted, both by the public administration and by the public itself, will gain more effect. The level of transparency and increased possibilities of participation in the production of legislation contribute to the legitimacy. [...] This programme plan introduces a strong relationship between architecture, production infrastructure, legitimacy of legislation and ICT technologies. Both government and the citizen are explicitly defined as ‘users’ of legislation. The attention for feasibility increased in the Netherlands over the years (G.J. Veerman, 2010, P 50, S. Mul, 2010, S.Dobbelaar, 2010).

In 2012, the Legis project made an explicit statement about the cyclic policy making process. [...] “Een tweede essentiële voorwaarde voor het bereiken van de kabinetsdoelstellingen is een goede verbinding tussen beleid, wetgeving en uitvoering. Onder uitvoering worden hier niet alleen uitvoeringsorganisaties binnen de overheid verstaan, maar alle gebruikers van de wetgeving. De wet in wording en de wet in werking moeten in feite steeds met elkaar geconfronteerd worden via de actoren die daar een rol in spelen. Dat vergt goede organisatorische voorzieningen die de ‘fysieke’ afstemming tussen alle actoren bevorderen; beleidsmakers, wetgevers en uitvoerders moeten meer dan nu het geval is, met elkaar om tafel” [...] Translation [...] “A second essential condition to achieve the policy goals of the Cabinet of Ministers is a strong connection between policy, law making and execution. With ‘execution’ we do not only mean the governmental executive agencies within government, but all users of legislation as well. In fact, the ‘law in the making’ and ‘the law in the working’ will have to be constantly measured against each other via the actors that play a role in the process. This measurement of actors requires sound organisational facilities to ensure much more physical contact between policymakers, legislators and executive agencies, than in current practices” [...] (Programmaplan LEGIS, 2012).

The notion of efficiency and accessibility are also drivers for the KEI-programme that started in 2015, which is the Dutch most recent programme for ‘digitalisering van de Rechtspraak’ which I translate as Digitalisation of the Judiciary. In 2015, this organisation receives an average of 12,000 ICT-related calls a month (!) from their legal colleagues in the judiciary administrative system. The challenge to support the courts, judges and support staff with digital means is immense and this is only the ‘internal’ client group. ‘It is no easy task to provide a judge with the equivalence of three rooms filled with paper dossiers on one single digital computer screen’, states Stefan Dekker, interaction team leader at Spir-It while showing how these paper-filled rooms actually look like. Scientific observers mention the potential for transparency that is provided by the digitalisation programme (C.Prins, 2016).

A member of the Dutch Council for the Judiciary states the following motivation: [...]Digitalisering van de procedures: dat doen we omdat de samenleving dat van ons vraagt. Als je letterlijk alles digital kunt doen: bankieren, winkelen, parkeren, kan het niet zo zijn, dat je alleen nog voor de Rechtspraak naar de brievenbus moet. Als we dit niet doen marginaliseert Rechtspraak en dat mag niet in een Rechtstaat [...] Translates as: The digitalisation of the legal

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32 https://www.rechtspraak.nl/Voor-advocaten-en-juristen/modernisering-rechtspraak/Paginas/default.aspx
procedures has to be carried out by us, because society demands it from us. When everything else is literally digitalised, e.g. shopping, banking and parking, then it would be unimaginable that Law would be the only instance left, where you have to go to the mailbox for. If we do not act, then the Judiciary and adjudication will be marginalised and that cannot be allowed under the Rule of Law. (K. Sterk (2016) [...].

The latest development regarding legitimacy and feasibility of policies and laws with help of ICT is the increasing critique on the controllability of ICT-projects. In 2015 the continuous inadequacy of the Ministry involved to manage the PGB-budgets (personal budget) administration for Dutch elderly people and people with disabilities threatened to jeopardize the – until then – very popular minister van Rijn because of the mistakes about estimates of the complexities involved and the ways in which the ministry tried to cover the problems. The Dutch parliament had already ordered a special committee to investigate the causes of failing ICT-projects in government in follow up of earlier reports by the Dutch Rekenkamer (Rekenkamer, 2006-2007, Committee Elias, 2013-2014). The committee based their recommendations on the findings of a thorough investigation and international literature studies. It is interesting to note that the second most important reason for failure found by the investigating agency was about design and listening to users: [...] “In verschillende casus zijn de oorzaken van problemen te herleiden tot het gebrek aan een systematisch ontwerpproces waarbij bijvoorbeeld specificaties (nog) niet helder zijn en er onvoldoende aandacht is voor wijzigingenmanagement. In diverse casus is het belang van stakeholders, zoals gebruikers, mede-regievoerders en/of opdrachtnemers, regelmatig onderschat of onvoldoende meegenomen, waardoor er onvoldoende draagvlak blijkt voor de te realiseren systemen.” [...] “In the different cases the cause of the difficulties can be related to the lack of a systematic design process where specifications are not clear and not enough attention was given to change management. In the different cases the interests of stakeholders, such as users and other problem owners or stakeholders were systematically underestimated, which resulted in a lack of support for the implementation of the systems” [...] (Tweede kamer, PRC, p. 5, 2014). This observation is interesting because the special committee – aside from the recommendations about cutting size and tendering functionalities rather than specifications – did not seem to address the implications of such an inadequately organised design process in government agencies in their final 34 recommendations (Tweede kamer, Eindrapport, p.22, 2014). I will come back to this issue of feasibility and complexity in Chapter [XI]

In the overview the assistive role of technology shifts from the means to support top-down monarchs and governments in bringing the rule of law to the ruled towards the means to support the administration of a society in a more effective and efficient manner. In the next section this shift continues to develop into the direction of shared responsibility.

History C: Discourse and co-regulation
The report from Hirsch Balin formally introduced another concept into the Dutch arena of legislation production; that of self-regulation. In his report, Balin states that there are limits to the ambition of what government can achieve and other manners of regulation should be found (Hirsch Balin, 1991, p.51). This concept, and especially, the acknowledgement of the limits to the executive power of government, is relatively new to the Dutch playing field. From a historical perspective, this is interesting, because the challenge to the ambitions of government seems allotted to feasibility issues, rather than as a result of a lack of political power. The limits to what government can achieve with regard to legislation became very clear when department staff sections started their own programs to inform internal government colleagues about the legislation of the neighboring Ministries:

 [...] “De hoeveelheid en complexiteit van wet- en regelgeving nemen nog steeds toe. In lijn daarmee zijn ook het omgevingsrecht en het aanbestedingsrecht belangrijker geworden voor de Raad voor Vastgoed en de daarbij aangesloten diensten. Het volgen van ontwikkelingen en het informeren van de medewerkers over deze rechtsgebieden, zijn van groot belang. De Raad voor Vastgoed heeft daarom als centrale vraag voor het jaarthema 2008 gedefinieerd: Hoe heeft elke dienst georganiseerd dat nationale en Europese veranderingen in het omgevingsrecht en het aanbestedingsrecht bekend worden binnen de hele dienst?” [...] Translates as: [...] “The quantity and complexity of laws and regulations is still increasing. Consequently, the contingency or environmental law and acquisition law have become more important for the Dutch council of Real Estate, Ministry of Finance and accompanying executive agencies. The monitoring of those regulations and the information provision to our civil servants is of great importance. The Dutch Council of Real Estate has therefore chosen to name the central management theme for the year 2008: ‘In what way have the sub agencies and sub-departments of the council organized the information provision of their employees about European legislative developments?’ [...] (Raad Vastgoed Ministry of Finance, 2008).

The limits to the organizational power of government with regard to legislation are related to several dimensions. One of those dimensions is the speed of changes. In 2013, Donner, Vice President of the Dutch State Council voiced his concern about the speed of legal production. According to our highest Dutch Legal Council: ‘the law-making adopts the character of policy-making that is subject to constant adaptation and changes’ (RvS, Year Report 2012, p. 45). The state council elaborates on the consequences of these developments for legal equality and consistency. Prominent among such consequences is the effect on some of the fundamental aims of law: creating certainty, predictability and stability. The council addresses the problems with effectivity, maintainability and legality in the same report: ‘Sinds de vastlegging van het wetgevingsproces in de Grondwet van 1848 is dit proces vrijwel gelijk gebleven. De manier waarop regels in de samenleving doorwerken is sindsdien wél

34 I have not found a satisfying translation for the Dutch term 'omgeving'. It literally translates as 'surroundings' and its meaning in the legal sense deviated from environmental towards a broader concept of 'surroundings'.
In January 2007, the European Commission launches the eParticipation preparative action programme to improve the self-regulation part of legislation and policy-making. Their approach is not self-regulation from a feasibility perspective, but, building on the user-centred perspective, from the perspective of open discourse. The ‘e’ – standing for ‘electronic’ – indicates the significance of ICT technologies as part of the programme, as it derived from earlier EU-initiatives such as eDemocracy and eGovernment. Although some may define eParticipation as an attempt to improve direct democracy (e.g.: ‘the use of information and communication technologies to broaden and deepen political participation by enabling citizens to connect with one another and with their elected representatives’, Macintosh, 2004), others put more emphasis on (e)Government administrative processes. Those processes may concern administration, service delivery, decision making and policy making. The eParticipation debate is often concerned with the need for transparency in a very broad sense. eParticipation is technology-enabled shared decision making, but it is often subject to distrust: ‘Clear, transparent, rules-based discourse and accountability may be more important than ICT to increase participation’ (Eu eParticipation summary report: 2009, p.19). This statement in the 2009 European Commission report illustrates the central theme of this dissertation:

The tension between ICT seen as an enabler of government policy making processes versus ICT seen as a threat to transparency, a threat to the trust-relationship with the government as well as a source of alienation.
ICT technologies, legitimacy and regulations: Aid or Alienation?

In 2003, the Dutch government decided to create a legal base for the transparency of law by installing a ‘registry of public inhibitions concerning property’ (Wet Kenbaarheid Publieke beperkingen onroerende zaken) that should inform the public about rights and obligations concerning real estate property. Early attempts to provide access to legal sources, such as www.overheid.nl, promoted by senior policy members of the Ministry of Internal Affairs (H Flier, K. Keuzekamp), acknowledged the real need to provide accessibility. It also occurred to government officials that one could leave behind the notion of one super database with all legal sources in favour of a decentralised system based on standardisation and retrieval from many distributed sources, such as the one held by municipalities (R.de Rooij, March 2004). The problem with this ICT approach to accessibility is that it did not help the user much with his case. As I will describe in the next part of this chapter, the retrieval mechanism does provide literally access to a huge set of legal sources, but it did not help with neither relevancy, nor with the context of the user. The resulting effect is alienation:

36 http://wetten.overheid.nl/BWBR0016876/geldigheidsdatum_07-04-2013
37 “Voorstel tot het verbeteren van de toegankelijkheid van wet-en regelgeving van decen- trale overheden”, Ministerie van BZK, November 2003 (“Proposal for the improvement of accessibility to local laws and regulations” , Ministry of Interior) and “plan van aanpak transparantie van overheidsinformatie”,versie 0.95, Sticting ICTU, programma advies overheid.nl, 18 febr 2004 (implementation plan transparency and accessibility of public data)
the visitor of the website experiences a feeling of confusion: the legal sources seem to be there, but the understanding is still out of reach and professional help is still required 38.

In the course of the ICT introduction used for increased effectivity and efficiency a public debate was started about the alienation that could emerge as a side effect of government usage of ICT. This public debate was brilliantly illustrated by comics like Little Britain 39 who enacted a new breed of Kafkaesque bureaucracies in 2004: ‘the computer says ‘no’, (see illustration on the next page). In 2006 the Dutch ‘purple crocodile’ commercial of the insurance company OHRA became such a part of the public domain debate that it was adopted by the Ministry of Finance when announcing its new plans regarding the reduction of administrative burden in tax regulations 40. The plan was literally called ‘the purple crocodile plan’ Hoogwout 2010, p.51). The computer system and its rigidity was a significant part of the commercial. In January 2013 the Dutch public debate became an explicit legislative discussion when ‘the computer’ had ruled that a seeker of asylum was to be sent back, upon which the individual committed suicide. The ‘Dolmatov debate’ mentioned the 300 human beings being treated as ‘radio tick boxes’ that illustrated the feeling of alienation and de-personalisation with regard to the computer system of the immigration office 41.

The debate was followed by a debate in Dutch Parliament that resulted in a motion against the acting Minister van de Steur. It is interesting to note one of his defence statements in Parliament (kamerstukken April 8th 2013). […] “Het ten onrechte vastzetten is in dit geval veroorzaakt door een onjuiste en onduidelijke instructie over de wijze waarop je in het computersysteem moet aangeven of iemand al dan niet in beroep is gegaan, aldus de inspectie. De daaruit voortvloeiende onjuiste uitvoering van een op zich bestaand beleid heeft ertoe geleid dat de heer Dolmatov als verwijderbaar werd aangemerkt. Dat heeft in dit geval geleid tot het ten onrechte vastzetten van de heer Dolmatov 42.” […] This translates as: […] “The illegitimate detention in this specific case was caused by unclear instructions on how to signify that someone had or had not called for appeal in the system, and so are the findings of the inspection. As a consequence, the execution of standing policies has led to the labeling of Mr Dolmatov as ‘subject to exile’. This has caused the illegitimate detention of Mr Domatov in this specific case” […] The statement above highlights the design issues regarding INDIGO, the immigration office digital case processing system. It also points to the illusive boundary between system design issues and human failure (in this case, called: ‘a gap in training’). ICT technology can be perceived as ‘the cause’ of problems and is sometimes seen as the ‘decision making power’. The fact that the computer system has been designed by humans and that the legal knowledge is engineered by humans appears to be easily forgotten. The same type of

38 Professional help will always be required, but the information provision could be improved.
40 http://wetten.overheid.nl/BWBR0020829/geldigheidsdatum_11-05-2013
41 http://www.nrc.nl/nieuws/2013/04/17/fout-vinkje-bij-driehonderd-lotgenoten-dolmatov/
42 http://www.tweedekamer.nl/kamerstukken/verslagen/verslag.jsp?vj=2012-2013&nr=77
discussion occurred in February 2014 when the Dutch supreme court in Leeuwarden judged that 280,000 speed limit fines were issued illegally by an automated process called ‘civil servant 404040’. The RDW (Ministry of Transport) countered that a human team leader 6009230/2 had mandated all automated processes, but the Court judged this mandate unsatisfactory. ‘Fines are not to be issued solely by a computer, without human intervention’ (Supreme Court cited by Volkskrant, Feb 22nd, 2014). Again – and in line with the position of Bovens about system bureaucrats earlier in this chapter (Bovens, 2000) – we can observe a type of alienation when humans feel ruled by machines in an uncontrollable bureaucracy. The link between information systems and alienation has been described by Geyer as an old concept in sociology related to ‘modernism’ that has been revived due to the information overload and the abundance of choice that came with the internet revolution (Geyer, 1996).

ICT technologies or co-regulation and discourse

The legitimacy challenge issue with co-regulation in the form of eParticipation and eVoting is, that it often addresses only the final decision-making process for a specific case rather than the integral policy design process or legislative designs. A second legitimacy problem as indicated by other researchers is the danger of polarization between the actors involved when voting for or against is the sole purpose of the ‘participation’. In this case co-regulation is confused with direct democracy and the balancing of interests is reduced to quantitative measurement of votes and not by seeking common grounds for understanding.

There is a considerable body of knowledge related to the term Participative Geographic Information Systems. In this area, many of the proposed systems and tested theories deal with spatial planning problems. Similarly to the present research, part of that body of knowledge is related to participative spatial planning (PSP), but the focus of most of that research is on the eDemocracy-aspect of the design (McCall, 2002, p.554-558, Berntzen et al, 2005) A researcher using Habermas’s views on open discourse to investigate the map based decision support and conflict reduction or prioritisation earlier, was Jim Sheffield. In his research he found that one of the problems with participative GIS was the constant debate about the meaning of the evaluation metrics used: ‘The second set of problems was associated with ongoing confusion about the conceptual basis for evaluation of the scenario options’ (Sheffield, 2007). This could be seen as a legal planning problem. From the viewpoint of the local government agencies, the second legitimacy problem is, that the incidental character of eParticipation is expensive and difficult to implement. I will elaborate on these issues in Chapter [VII].
2.1. Three legitimacy challenges

We may conclude that governments and their agencies have recognized ICT technology as a necessary aid in creating accessibility, knowability, feasibility and effectivity of law. At the same time technology may be perceived as a threat that undermines legitimacy and alienates the public. From the theoretical and historical overview presented above I can now formulate three long standing challenges with respect to legitimacy, technology and ‘legal information’.

- The relationship between legitimacy and ‘accessibility’ and ‘knowability’ of legislation:
  Technology could help, but there are acknowledged problems with eRetrieval.

- The relationship between legitimacy and ‘feasibility of case handling services’:
  Technology could help, but there are serious problems with explanation of the legal effect and the perception of fairness in a growing administrative complexity. Case assessment of actual or virtual cases is an essential ingredient of legal planning and serves information provision on complex legal issues.

- The relationship between legitimacy and ‘legal design process’ and ‘discourse’:
  Technology can help, but there are issues of trust and too much technological determinism and costs. The technology supporting such discourse should enable the balancing of interests between different stakeholders taking into account the collective interests of society while respecting individuals’ interests.

These aspects and challenges have to be analysed against the existing theoretical background. After establishing the state of the theory, the next research steps can be identified for A, B and C.

2.1.1. Theoretical perspectives on accessibility and knowability of legislation [A]

eRetrieval

In the historical overview, the role of technology during the first centuries was about access to legal sources. Knowability is an important factor for legitimacy and one cannot be expected to know the law if legislation is not accessible. Consequently, there is no basis for legitimacy without accessibility. Therefore, it is logical to investigate whether access to law has been improved by means of digital technology and if this has positively impacted knowability. I will now explore some theoretical aspects of access to law and case assessment and investigate the extent to which existing theories help clarify these legitimacy issues. In 1985, Blair and Maron published an article on the (lack of) effectivity of automatic document retrieval in a legal information context. What they found was a very low recall rate, but a high precision rate. They also found that professionals using the
technology thought that they had retrieved 75% of relevant information, while in fact they had only retrieved 20%! (Blair and Maron 1985, p. 295) Accessibility of law has often been defined as retrieval of law. The retrieval of legal information has been investigated from several angles. Luuk Mathijsen describes the technology gap between legal professionals and ICT technologies in general and mentions the usability problem already described in 1985 reports from the European Commission (Mathijsen, 1999 p.13, quoting an earlier research of Lloyd, 1986). Commercial access systems for legal professionals like Lexis and Westlaw are also considered complex and hard. In 1987, Jon Bing wrote a well-known handbook for information retrieval about legal sources. ‘These database systems store legal sources in textual form, and offer a number of mechanisms for their retrieval’ (Bing, 1987). Some of these systems use AI techniques in the retrieval process by providing matching algorithms and procedures, for instance based on probability, which determines the extent to which a certain source is relevant to a given search request (Turtle and Croft, 1991). Maxwell and Kafer discuss what they see as two main retrieval schools of thought: the Boolean textual retrieval school and the inference knowledge based system school. Both schools are seen as inadequate to handle the accessibility problem: [...] “Modern IR may step up to the challenge, but there is a long way to go. Legal IR is currently divided between text-based Boolean retrieval, knowledge engineering (KE) frameworks, epitomized by West’s Key Numbers system, and inference network IR. None of these approaches efficiently and reliably produces all and only the relevant cases for a legal search.” [...] (Maxwell and Kafer, 2005) Furthermore, the authors point at a ‘misalignment with needs of the professionals: [...] “An alternative to KE-based approaches - automated text analysis - has achieved success in combination with hyperlink analysis in open domain search, and there may be much that the legal IR community can learn from this field. However, the fact that law has not adopted practices common in open domain retrieval may be indicative of how, until now, these technologies have been misaligned with the needs, expectations and conceptual resuppositions of legal professionals.” [...] (Maxwell and Kafer, 2005) Liebwald describes the problem in more detail: [...] “It is interesting matter that since the classic ‘handbook of legal information retrieval’ edited by Jon Bing was published in 1984, improvement in legal information retrieval has not seen any major advancement. Quite the contrary, information overload and increased demand for cross National and cross lingual legal information has amplified the basic problems. Legal information retrieval systems still do not represent structural knowledge, user friendliness regarding search strategies and input formats is lacking and information about system functions and information content (completeness) is often not sufficient. Also continuity representation of time layers and consolidated versions are inadequate and different users situations and information needs are disregarded. Finally, finding the correct search terms is a game of change, language approximation is minimal and even simple linguistic tools are missing.” [...] (Liebwald 2001, quoted in Casella, 2007, p.4) If it is difficult for professionals to access the relevant legislation, the same task may become impossible for business managers without years of legal training.

43 www.lexis.com and www.westlaw.com
44 For a comprehensive listing of retrieval initiatives see also: http://ejlt.org/article/view/15/20
Preliminary research by Newman and Philips Leith

The preliminary research for this dissertation was conducted by Philips and Newman in collaboration with a Dutch development team\textsuperscript{45}, that I’ve been part of. This team examined how people with some level of legal knowledge, or practitioners with experience in using legal information, deal with the existing legal information systems (Leith and Mcullagh, 2004). During collaboration between Context\textsuperscript{46}, publisher of Justis, Peters and Wilson worked on improvement of this kind of service for non-lawyers in 1999-2002. This was intended to provide a baseline for improvements over current practice. The evaluation employed scenarios from an earlier requirements study which clearly showed that typical users start with a domain-specific task-support requirement, and then transform this to an information-seeking strategy, and finally secure relevant information to use in satisfying a task (work) need. Each scenario had a set of known problems relating to how people develop an information-seeking strategy, and how they find the necessary information, and, finally, how they then understand and make use of it in a satisfactory way. The set of scenarios and related problems was used to design an enquiry using interviews of experts, coupled with the protocol analysis of observations of users carrying out example tasks. Tests were then carried out with seven non-lawyers who came from a planning or environmental background, but who had no specialism experience in law, and five professionals who had a background in law but were not necessarily fully qualified lawyers. Significant examples of the problems for users with no legal experience included making sense of the found legal texts (understanding), knowing which documents were relevant to their problem, completing search forms in a way that conforms to system requirements, targeting relevant information inside lengthy legal texts, identifying ‘amendments’ to the law, and finding the ‘commencement date’ and ‘extent’ of laws. In addition, numerous usage problems were seen which derived from a poor interface design in the observed systems. Newman and Leith had identified, that a wide range of professionals have to rely on legal information. They require legal knowledge support either for their non-lawyer status, or in the context of their specific professional tasks. Modern business development and operation involves constant reliance on legal knowledge, and may involve expensive legal representatives (experts). Apart from the enormous complexity of legal information in Europe, the reliance on experts is also driven by the highly specialised nature of the content, both in terms of its specific technical language, and in terms of the knowledge required for interpretation in a specific case (Leith and Mcullagh, 2004). Current commercial support and scientific work in this area mainly targets lawyers rather than business managers, and less support is available for the many ‘intermediaries’ (advisors who are not lawyers, such as business planners). According to Leith and Newman, the existing legal database-driven infrastructure, even with the possibilities of modern technologies such as the Internet, was not supportive for its users and fails to support immediate services to the end user (Peters and Wilson, 2003, Leith and McCullagh, 2004, Newman and Doherty, 2008).

\textsuperscript{45} The research collaboration was part of the Addwijzer project of the eContent programme of the European Commission

\textsuperscript{46} http://www.justis.com/
Accessibility and knowability from a business user perspective

The literature research and historical overview presented earlier leads to the conclusion that database accessibility using digital database technology did provide accessibility, but it seemed to be not very helpful to serve the needs of the users. In Chapter [I], in the discussion about www.overheid.nl, I wrote that the service based on the huge legal database attached to this website did not match the needs of its users. Neither the LPG business manager, nor the real estate broker or the recreational planner could use the database in a way that helped them to articulate their case or retrieve relevant answers. Raph de Rooi - then technical advisor www.advies.overheid.nl and now one of Europe’s leading web accessibility experts – commented on one of the problems with providing relevant access: [...] “More and more government information, is provided through the Internet, mostly in the form of documents and records. This information is provided in compliance with of national cabinet instructions. “The government exists in the Dutch Internet on more than 1200 separate websites, so we can speak about an enormous, fragmentation and it will only increase!” [...] (Raph de Rooij, 2004). Raph’s statements describe the problem of pluriformity. There are many laws and regulations that may be relevant for a use case and it is difficult to identify what could be relevant, even for professionals. The assumption is that this access design and this application of technology are not sufficient to help users with the definition of a use case scenario and the identification of relevant legal constraints. The amount of ‘hits’ yielded by a specific keyword in overheid.nl generated too many results and their relevance was not recognisable.

Within document retrieval one usually defines the adequacy of the technological solutions in terms of precision and recall and results are usually also ranked in some way using some sort of utility function. In the context of my research, however the possibility for the user of legislation to understand the effect of rules in the context of the use case and its societal environment is the most important criterium for the adequacy of such technology. Relevancy is consequently linked to the concept: Knowability.

From a business user perspective, the problem of accessibility could be complex. Regulations in their context emanate from different levels of government (e.g. local, regional, national, European), as well as from different types of regulatory authorities (e.g. water, food and hygiene, public safety, transport, building, etc. – legal pluriformity. This often entails relying on different types of legal experts to combine the required specialisations. Furthermore, legal texts referring to spatial domains do not easily support reasoning about locations. Business activities require an acceptable location to perform them and the applicative power of law is typically restricted to areas, being either states, regions, provinces etc. The problem of understanding both – ‘where this law applies’ – i.e. the legal area of applicability (jurisdiction), and – ‘where can-I-perform-this business activity’ – may, therefore require both consultation of legal experts, knowledge about the societal context and negotiation with regional authorities. ‘During the investigations of Leith and Newman, a specific concern was raised by our design team in collaboration with the Province of South Holland’ (Peters and Wilson, 2003). This concern was about businesses that took the effort
trying to expand and were facing time-consuming processes, which resulted in a negative ruling by local government without any indication of how to find an alternative solution.

Conclusion [A]

It was clear for the design team of www.overheid.nl that business managers and advisors required legal knowledge support to understand the implications for their case where they themselves could prepare a ‘viable’ case before taking it to a legal expert for completion. This is called case assessment.

In order to explore this aspect [A] of legitimacy, I will provide a distinction between accessibility and knowability of legislation.

Accessibility’ to law is defined here as:

The technical possibility of the user of legislation to access legal sources, articulate a question and find potentially relevant rules.

‘Knowability’ of law is defined here as:

The possibility for the user of legislation to understand the effect of rules in the context of the use case and its societal environment.

In the first part of this dissertation, I address the potential of technology to support knowability and accessibility of law. I will explore whether technology provides the means for the user to put the relevant legal sources and rules into the use case context. I conclude here that access to law and knowability of law was broadly recognised as problematic and that providing direct access to the complex structure of regulative architecture, interlinking and content listing, is regarded as troublesome. There is a need for better support, both for experts and for layman users, which requires a better design. The existing theory on such an improved design points towards case assessment based on the inferences that help to map the needs of a business user with the context of the legal and societal environment where a business activity can be performed.
I have operationalised this in Operationalization [I] that I use for Experiment [I] as part of the overall research plan, see Chapter [III]. The gap that I intend to fill with the appropriate technology is depicted in figure 8.

Figure 8: Gap analyses A

The experimental set-up for Experiment [I] is summarized in figure 16 <> . This figure will be used as ingredient of the overall picture describing the research design of this thesis research see figure <> in section <>.

Figure 9: set-up for first experiment as part of the overall research plan.

Legitimacy Type I – Experiment [I]

Legitimacy challenge of knowability.
Question: potential of technology to support government to offer access and case assessment for the citizen's need of legal advice about rights obligations and opportunities.
Example: the business manager seeking answers
Solution design: maps
2.1.2. The challenge of legal effect planning and (legal) information serving [B]

The second challenge addressed is legal effect planning and information serving. As stated before, case assessment of actual or virtual cases is an essential ingredient of legal planning and requires information provision on complex legal issues. Legal effect planning has a number of clients:

- The policy-makers require preliminary insight in the potential effect of the intended policies.
- The local agency requires insight in the consequences of implementation of law.
- The citizen or user requires assessment of the effect of rules and regulations on his or her use case.

The second set of legitimacy issues mentioned in the historical overview of ICT technologies and law concerned three items. These items were the feasibility of implementation, efficiency increase in case handling and the avoidance of mistakes to maintain legitimacy. A second main theme mentioned there was the development towards a more user-centred service approach for the user. In order to explore a theory of design of legal accessibility from a user perspective, it appears to be relevant to broaden the scope of accessibility towards the provision of case assessment as a government service. The case assessment of cases should not just result in a simple allowed or disallowed, but rather inform the client of such service on where the required business activity can be performed (Opportunity finding). Legal service in this context implies opportunity finding. When I performed my research for this thesis, available database technologies (Legal Information Serving or LIS) were completely inadequate for addressing such legal questions. This observation is also supported by research on Legal Information Serving (LIS) investigated by a group of researchers (Breuker, 92, Winkels and Boer, 2002) “In fact LIS requests may hardly ever give a direct match to norms, because norms are abstractly formulated to provide a large coverage of situations. For that reason, the use of Database technologies or text retrieval methods leads to low precision and recall scores” (Winkels, Boer and Breuker and Bosscher, 2002). André Valente provides some models to identify the problem of what he calls the ‘social agent’ acting in a legal environment. He has a legal service approach and does set the user as client in need of a service. He identifies the assessment problem, the planning problem and the assignment problem (Valente, 1995, P.138). Winkels and associates (2002) define the core of a legal information server as a “normative assessment of a case, given a body of norms”. They add the notion of validation of those norms in case of a conflicting results. This validation is then expressed in terms of deontic logic types of norms (permission, prohibition, and obligation) and normative qualifications (allowed, disallowed). A number of researchers have investigated ‘Legal information Service provision’, e.g. Breuker who provides an excellent description of the problem of legal knowability:
“As the following examples of legal requests may show, often there is not a direct textual or conceptual correspondence between the topic and the legal source.

Does the law say anything about declaring stolen property?
Should I marry to avoid being expelled out of the country?
Is it forbidden to borrow a house?
Can I park my car on the left hand side of the road?

Aside from the fact that specific relationships are requested, a database retrieval will in all cases return many sources, because the terms used are sufficiently general. However, not one of these sources will contain an answer to these questions. Moreover, under the naïve rule that everything is allowed that is not forbidden, the user is tempted to conclude that he will not get into conflict with the law if no matching legal source is found!” ([Breuker, p. 94, 2002]).

Breuker mentions spatial reasoning as a ‘common sense’ support mechanism for what he calls ‘inference making’ when discussing the fourth example above about parking cars and the location of bicycles: [...] “The upshot of this short and informal analysis of what is in a legal question is, that answering almost always requires making inferences. They are of two types: about the world of regulations refer to and about the relationships between articles or cases in a legal source, in particular the structure of exceptions. This full answering of legal questions is called ‘legal information serving’, in contrast with database retrieval aimed at collecting legal sources which contain similar or the same terms as the request. ([Breuker, 2002 P.92). The search can only halt by a match or a contradiction and both are often not derivable from the regulation itself, but by common sense reasoning, e.g. the required spatial reasoning on the pair of bicycles” [...] ([Breuker, 2002, p 95]). Breuker elaborates on the requirements for legal information serving and provides a number of aspects of making inferences to provide a service, like situation descriptions, taxonomies, world models and decompositions. I will apply some of these methods in Chapter [VIII], in the technology section of Experiment [III].

Legal information provision as a (e)Government service

In Chapter [I], I have argued that access to law and case assessment should be seen as a user-centred approach to public service design. A number of aspects - such as integration with eGovernment processes and enforcement, or such as broadening towards different sectors (pluriformity) - suggest that access is not restricted to only one service, but to an infrastructure of services for different sectors. We will analyse the theory on services below and our key-question is: What theories on law as-a-user-centred-service exists and can they help us with our design questions? We will investigate what a (government) service and what the relationship between government service and law are. As I have described in Chapter [I], the design approach to better legislative systems is directly connected to a design approach of eGovernment ‘services’. The term ‘services’ is related to the concepts of implementation and delivery. Research on eGovernment services started in the late 90s where builders of
government websites and portals started to realise that an internet website is only the front-end of delivering services to citizens. More work was done under the umbrella of the Dutch early BIOS nota’s and the ‘Action programme Digital Delta’ that initiated efforts to ‘create an effective and efficient government service delivery by deploying ICT’ (Ministry of Economic Affairs, 1999). Venrooy applies the formal Dutch definition of government services as:

I. The execution of the legislative base-roles of government (the delivery of documents, decisions and permits) on government services
II. The execution of the care taking roles (the delivery of benefits and facilities)
III. The information provision about those roles

(Raad Openbaar Bestuur, 1998 quoted by Venrooy, 2002, p. 5)

Quoting several sources of electronic government programmes, Venrooy states that ‘efficiency’, ‘effectiveness’ and ‘client centredness’ are agreed design features to measure eGovernment services and service chains (Venrooy 2002). Bekkers has added some interesting roles to the list of Venrooy (A.M.B. Lips, Bekkers, V. & Zuurmond, A. (Ed.), ICT en openbaar bestuur, 2005). I will come back to the specific roles of government services in chapters [VII] & [XI]. The ‘service’ provided by government is firstly to be seen as a link between the legislative role of government and the execution of that role in terms of delivery. According to this definition, the law is a given and the challenge is to develop a well-thought design of the execution as ‘services’. Law itself or communication about law is not seen as a service. I will argue that this separates the policymaking, the legal source and the implementation in such a way that its design is less user-centred, less effective in implementation and less feasible.

The European perspective on the users

An important driver for the application of technologies to improve government administration in Europe has been the European Commission. Over the last 25 years, the Commission have sponsored research and pilots in numerous programmes and standardisation efforts (Lisbon i2010 agenda and the Europe 2020 agenda). Therefore it is relevant to investigate what the Commission has defined as goals for those research and pilot programmes. The European Commission set as a target for eGovernment the following

47 BIOS 3 nota, actieprogramma electronische overheid, digitale delta, Rapport Snellen, etc.
49 https://ec.europa.eu/digital-agenda/node/1033
agenda for European funded research. With the EU i2010 action plan 2011-2015, the European Commission sought to accelerate the delivery of benefits for all citizens and businesses, making sure that there would be no new barriers due to fragmentation or interoperability. The following five major goals were set:

1. No Citizens left behind.
   Make sure that every citizen can access the benefits from innovative services of the government.
   To contribute to higher user satisfaction, transparency and accountability.
3. Implementing high impact key services.
   To make 100% of public procurement available electronically, with 50% actual usage and to create agreement on services to be implemented.
4. Putting key enablers in place.
   To enable citizens and businesses to benefit from secure and interoperable authenticated access to public services.
5. Strengthening participation and democratic decision-making.

The European Commission sought to provide better access to ‘services’ and to enable citizens and businesses to ‘benefit from’ them. According to this definition, the legislative role and its execution are seen as something ‘to benefit from’. Hoogwout questions the legitimacy of the concept of “service” from government in itself, since most of those products are not the choice of the citizen but an obligation set by government (Hoogwout, 2002, 2010). He also differentiates between services for citizens and public services (like street lightning). Hoogwout even questions the premises that governments should be serviceable in the first place. For our research the need for legal ‘services’ is hard to deny, however, as citizens and businesses have to be enabled to comply to law. In all cases the service delivery has to be designed.

Towards a legal service infrastructure

As described by the commission and many European National interoperability frameworks (Saga in Germany, eGIF in the UK, NORA in the Netherlands, Belgif in Belgium, to name a few, see also Chapter [V]), the notion of interoperability implies the need for a coherent structure that enables the exchange of information and eGovernment services. While this notion that is natural to the world of ICT technologies, it is not so common in the legal research field. Therefore, a precise definition of such a concept is due here.

50 http://ec.europa.eu/idabc/servlets/Doc2d7e.pdf?id=32124
A better design in the context of our legal infrastructure covers the whole range of acting government agents, is cost-effective in its policy implementation, case handling and enforcement and improves the access and involvement of citizens. Cost effectiveness, primarily defined as low content maintenance costs and alignment costs with other internal processes is an aspect that was raised primarily by the government experts involved in experiment [I] and [II]. The fact that one does not design and develop for one sector, covering one task, but for a pluriform range of physical activities of business and people that require regulations implies an obvious business case for maintenance and cost effective architecture. Those activities cover domain areas like building, recreation, transportation, energy, and environment and so on. Here I use the analogy of our drinking water infrastructure (see figure 10). The provision of clean drinking water is the government service. If we take the village water well as starting point, then having more villages and many houses requires a piping infrastructure.

Given the experiences with aqueducts and changing sources from the mountains with – as a consequence – changing water courses, it becomes clear that one requires a flexible piping system. If one envisions multiple domain (legal) services corresponding to the many temperatures of water, it would not make sense to manufacture a separate piping system for each temperature. Rather, it from feasibility, efficiency, or cost perspective it makes sense to create an infrastructure based on architecture and standards and capable of handling several varieties. Information infrastructure for law is similar.
Conclusion [B]:

A legal service infrastructure is required to support a user-centred legal planning and effect service in an efficient and effective way.

The legal infrastructure is defined here as follows:

‘A consistent and coherent structure of principles, standards, services and applications that supports the legislative process (the policymaking process and the legislative production process) and the legislation in action (implementation, case handling, monitoring, enforcement)’.

The emphasis is on technical interoperability standards, but also on protocol and doctrine. Infrastructure is used in many contexts and is evidently a container-word for many concepts. The above generates the following formulation:

The legal service infrastructure is defined here as:

‘A digital legal service infrastructure is the network of functionalities that together deliver legal eGovernment services according to a well-defined architecture’.

With such legal service infrastructure, which requires the combination of ICT services provided by different providers, a number of interoperability issues arise. In their IDABC-report, Gartner (2007) argues a case for interoperability to avoid the service of government even becoming a Kafkanian burden. [...] “Re-location between member states traditionally requires multiple administration visits in the originating country and again, multiple visits in the new country. Should a cross-border public service be available, citizens could rely on a one-stop shop in either country, dealing with transfers of address, phone-numbers, health certificates, insurance, permits, etc when re-locating.” [...] In 2010 the ISA programme took over the task of interoperability and standardisation from IDABC and INSPIRE was adopted earlier as the framework for interoperability in environmental issues: http://ec.europa.eu/isa/news/index_en.htm

Gartner published a study for IDABC on interoperability51 clearly stating the problems with partial solutions for service design. In ISA52 the implementation of legislation with ICT support is assessed. [...] Assessment of the ICT implications of new EU legislation: “The Commission is developing a method that could be used in preparing legislative acts with a view to achieving a better understanding of how ICT can support the effective and efficient imple-

The European Commission, as sited above, did not include the legal domain itself as a variable at that time. The legal element is only mentioned as a potential inhibition that may be hampering webservice-based design or support for service implementation. It was only in 2009-2010 that the European Commission started to treat cross border legal services as a priority as part of the eJustice programme. When the legal base is included as a parameter in the design process, it could become an active instrument, both to design a better service delivery and to support the policy implementation intended by the regulation. The design of law and service combined become instruments to realise a policy. The previously mentioned LEGIS programme did include the legal source as part of a policy cycle. In Chapter [V] I will explore the implications of a legal service infrastructure. Such legal service infrastructure is intended to support the user centred legal service for the business manager.

Figure 11: Gap analysis B; a second part of the research plan.

Combining law and service in a joined design process is sometimes seen as a violation of trias politica, however this is only the case from a political perspective. It is not the case if seen from a design perspective to align the policy and it’s effectuation.
I have operationalised the infrastructural challenges in Operationalization [II] that I use for Experiment [II] as part of the overall research plan, see Chapter [V]. The gap that I intend to fill with the appropriate technology is depicted in figure 11. The experimental set up is depicted below.

2.1.3. Challenge: Legitimacy and balancing the individual versus the collective interests [C]

The third challenge mentioned before is in finding technological support for balancing interests of different stakeholders where individual interests and the collective interests of the society are taken into account. Such a balance which is indeed supported by society members is an extremely important factor of legitimacy. Linda Senden has investigated the issue of such “substantive legitimacy” in the context of European law: […] “Yet, like in the national legal contexts there has been a shift also in the European legal context from such a classical, liberal conception of the rule of law to a more democratic and social conception, in which the realization and protection of general principles of law and fundamental rights have increasingly gained attention. Various authors have spoken in this respect of ensuring social legitimacy, of legitimacy granted by the rule of law and substantive legitimacy. Pescatore (1974, p 505) asserts that true, substantive legitimacy ensues from the adequate performance of the functions of government; legitimate power is understood to be the power that responds best to the expectations and needs of the public and that is capable of resolving the problems affecting it, i.e. that is best for the general interest. I too (Senden) understand legitimacy in this broad way, which can in particular be said to imply the duty to ensure good governance, demanding compliance with principles such as legal certainty, equality and legitimate expectations” […] (Senden, 2005, p. 9).

As stated earlier, Easton defines legitimacy as ‘the belief that it is right and proper to accept and obey the authorities and to abide by the requirements of the regime (Easton 1975, p.551). In this case, substantive legitimacy is a ‘belief’. Please note that Senden addresses the general interest side of legitimacy, where I observed legitimacy issues in the tension between individual and general interests. I will elaborate further on Senden’s position in Chapter
In his yearly report about the highest Dutch legal council, the Dutch (vice) Chairman of the State Council Donner seemed to be very aware of the legitimacy issue regarding law making: ‘Met rechtsvorming is in dat verband niet direct en alleen bedoeld wetgeving en rechtspraak, maar het gegeven dat overheidsbeleid en overheidshandelen in de rechtsstaat steeds mede moeten voldoen aan het rechtsgevoel en de fundamentele beginselen van recht. In die zin is verandering in maatschappelijke verhoudingen steeds ook rechtsvinding: het ‘vinden’, scheppen van verhoudingen die de burgers afzonderlijk en gezamenlijk in staat stellen om in vrede als persoon en gemeenschap tot recht te komen. Bijdragen aan die rechtsvinding is vanouds mede een taak van de Raad van State. (transl: Legal institution does not only mean Law making and jurisprudence, but also the notion that governmental policy and governmental execution in a legal system have to comply with the fundamentals of Law and the ‘feeling of justice’. A changing society implies therefore the constant obligation to discover Law in the sense of finding new balances in societal roles and conditions that allow the citizen to individually and collectively develop themselves in peace’ (P. Donner, Jaarverslag Raad van State 2012, p.19). It is interesting that he specifically addresses the notion of balancing the individual and the collective in their roles and conditions. This seems to be congruent with my problem statement regarding balancing of interests, see Chapter [I]. There is a body of research on eParticipation that may support operationalisation.

Ake Grunlund and Kim Viborg Andersen define eParticipation as: [...] “eParticipation refers to “ICT-supported participation in processes involved in government and governance. Processes may concern administration, service delivery, decision making and policy making” [...] (Avdic, Hedström, Rose, Grönlund, 2010). Instrumental eParticipation research, in contrast, involves the following: [...] “Determining the tools and methods which are appropriate for pursuing these goals. Here researchers have the task of understanding the different contexts of eParticipation, and developing better frameworks, procedures, methods and software tools for varying contexts and objectives. This research has the objective of improving the practice of eParticipation.” [...] (Sæbø et al. 2009). Joseph Raz created a moral conception of legitimacy between a government and supported by some logic, which he called the Service Conception. [...] “Governments are legitimate if there is a moral duty to obey them. And there is such a duty, if were people to try to obey, they would be conforming to reasons that apply to them anyway more closely or more successfully than if they do not. Subject to a proviso that government has no legitimate authority to intervene with matters regarding which it is more important, better, that people should decide for themselves than that they should act as they ought.” [...] Legitimacy of norms is then based on the assumption that the general public is aware that government has to take into account the interests of many stakeholders. In consequence, I could argue that technology may help to show the existing other interests that require balancing. I will further elaborate on the eParticipation debate in chapter [VI].
Legitimacy and information needs specified: introducing Habermas

The overview of theories and perspectives on accessibility and knowability of law provided above were chosen because they represent several operationalisations of the influence that technology can have on legitimacy. I need to operationalise my research question in those aspects of legitimacy problems that can be supported by technology. This is why, to seek balancing- and communication mechanisms that can be supported by technology, I need to have a closer look at the information needs and those aspects that undermine ‘Le Contrat Social. There are assumptions made between concepts like ‘trust’, ‘acceptance,’ and ‘fairness’ and the communicative aspects that are yet too vague to operationalise in field experiments. What information should exactly be communicated in relation to legitimacy? It is for this reason that I will investigate the theories of an acknowledged scientific authority on ‘public discourse’.

Habermas was in search of rationality in democratic society. Habermas gives a thorough analyses of rationalisation in society and of communicative action in relation to system of Law or what he calls “verrechtlichung”. (Habermas, 1975, p. 203) He argues that a system of rules has to be constantly justified to social stakeholders and is not in itself a stable foundation. The language (public discourse) used for stabilisation and justification has replaced the once stable platform of ‘traditional’ or ‘religious’ norm system. Habermas addresses the problem of formal legal rationality and its distance from a visible ‘king’ or other charismatic leader as a problem of legitimation. People can more easily relate to a king than to a system.

[…] “Administrative planning produces a universal pressure for legitimation in a sphere that was once distinguished precisely for its power of self-legitimation. Other examples of the indirect perturbation of matters taken culturally for granted can be found in regional and city planning (private ownership of land), in planning the health system (classless hospital), and - finally, in family planning and marriage laws’. ‘At every level, administrative planning produces unintended unsettling and publicizing effects. These effects weaken the justification potential of traditions that have been flushed out of their nature-like course of development. Once their unquestionable character has been destroyed, the stabilization of validity claims can succeed only through discourse. The stirring up of cultural affairs that are taken for granted thus furthers the politicization of areas of life previously assigned to the private sphere. But this development signifies danger for the civil privatism that is secured informally through the structures of the public realm. Efforts at participation and the plethora of alternative models --especially in cultural spheres such as school and university, press, church, theater, publishing, etc.-- are indicators of this danger, as is the increasing number of citizens’ initiatives.” […] (Habermas, legitimation crisis, 1975, pp.68-75, 1975). Habermas has studied bureaucracies and he warns against increasing institutionalisation without increasing explanation. The more activities become part of the public sphere (verrechtlichung), the more the obligation to explain all unintended ‘side-effects’. Government will be blamed for those ‘unsettling effects’ without the ‘taken for
granted’ authority of traditional (all hail the king!) or religious systems (all hail the god!). In 1997 Habermas continuous on this line of debate: “As power alone cannot grant it its legitimacy in modern society, law derives its validity from the consent of the governed”. Habermas derives a system of rights as well as shows how conditions for the exercise of political sovereignty can be institutionalized. With Habermas, Law is not so much superimposed, as it is the explicit condition for communicative action, where regulations are made in open discourse, “based on the ability of hearer and speaker to accept or reject the validity claims of mutual speech acts” (Habermas, 1997, p. 127).

Who is Habermas?

Habermas (now 86 years old) is defined as a sociologist member of the ‘critical (Frankfurter) school’ in the sense that he is said to have fundamentally different views on the nature and mechanisms of social structures in comparison to Marx and Weber. Where the latter define the social world as an object or ‘natural force’ separate from human activity, communication and language, Habermas sees ‘work’, ‘economy’, ‘rationalism’ and ‘bureaucracy’ as the construct of human interaction, communication and language (George Ritzer, 1988, p. 131, 137). Weber already distanced himself from Marx in his attempt to define capitalism as an idea inspired by protestant ethics, rather than a result of (naturally) conflicting interests about food and wealth (Weber 1905). Anyone reading Weber’s extensive work has to acknowledge his commitment to culture and individuals next to his fascination with structures and abstracts such as rationality and bureaucracy. The critical school adopts Weber’s substantive rationality and strongly rejects formal rationality and – interestingly to our research – what they call the influence of ‘modern technology’. Marcuse defines technology such as the television as a way to socialise and pacify the controlled population (Marcuse 1964). Technology is ‘Big Brother’ in Marcuse’s view. Avram Noam Chomsky is an influential twentieth century linguist and activist who in 1988 wrote the book ‘Manufacturing Consent’ concerning the abuse of mass media by corporations seeking to influence public opinion. When asked in 2008 about his views on the Internet, he still maintained the position that ‘Net Neutrality’ is extremely important to avoid those same corporations forcing the browsing citizen towards certain elite opinions by providing selective access and ‘a framework of indoctrination’ (Chomsky, 2008). Habermas, having witnessed the Nuremberg processes, is much more positively inclined.

Habermas defines communicative action where:

[…], “The action of the agents involved are coordinated not through egocentric calculations of success but through acts of reaching understanding. In communicative action participants are not primarily oriented to their own successes. They pursue their individual goals under condition that they harmonize their plans of action on the basis of common situation definitions.” […] (Habermas, 1984; p286).
In his view, while the end of purposive rational action is to achieve a goal, the objective of communicative action is to achieve communicative understanding. Undistorted communication is ‘the baseline’ in the theory of Habermas, whereas Marx and Weber focus on purposive rational action. For Habermas, the solution of the problem of rationalisation (and thus the loss of belief) and technological control of life, lies in the rationalisation of communicative action in parallel. He argues not against rationalisation in general, but against the excess of rational formalisation without proper countermeasures in communication (Ritzer, 1988, 139). As a theory, it is relevant for us that Habermas has been able to describe the notion of legitimation issues of our legal system not as a legal court case problem, but as a communication problem.

Our third experiment has been instigated by chairman Fred Wouters of the Dutch bird protection society, who stated that over the last 30 years he had won 50% of the court cases and lost another 50%. This may seem as a good outcome, but to him it was unacceptable since it caused fragmentation of the required ecology. In his view, the harmonization of plans of action in advance was vastly preferable over yet another set of court cases for the Ijmeer/Markermeer. (Fred Wouters, 2009). He argued that it was difficult to explain to the birds that the adjacent area was less ecologically friendly because he had lost his case in court”.

For our research method it is relevant that Habermas provides us with a reasonably exact definition of what this rational communicative action should encompass. He defines rational communication as “discourse” in the following way:

**Definition of discourse:**
That form of communication that is removed from contexts of experience and action and whose structure assures us:

¬ that the bracketed validity claims of assertions, recommendations, or warnings are the exclusive object of discussion,
¬ that participants, themes and contributions are not restricted except with reference to the goal of testing the validity claims in questions;
¬ that no force except that of better argument is exercised; and
¬ that all motives except that of cooperative search for truth are excluded.

(Habermas, 1975; p.107-8). Habermas further states that for an ‘ideal speech situation’ to occur among members of the public sphere must, however, adhere to certain rules. These rules include:

¬ *Every subject with the competence to speak and act is allowed to take part in a discourse.*
¬ *Everyone is allowed to question any assertion whatever.*
¬ *Everyone is allowed to introduce any assertion whatever into the discourse.*

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Everyone is allowed to express his attitudes, desires and needs. No speaker may be prevented, by internal or external coercion, from exercising his rights as laid down in (1) and (2).

In his later publications, Habermas develops his theory of rational commutative action into a view on the gap between what he calls the ‘life world’ (Lebenswelt) and ‘public sphere’: a micro level world where participants in communication come to an understanding with one another about something” (Habermas Theorie des communicatieves handelen, p.337) and the larger scale social system.

Figure 12: Jurgen Habermas.

The term ‘Lebenswelt’ or lifeworld was derived by Habermas from the phenomenology, the investigation into existential being (Heidegger, Merlot-Ponty, Sartre) and is used to clarify a person as an active participator trying to make sense in a communicative process, rather than as an observer or passive actor driven by pre-defined interests in a world governed by economic mechanisms.

Habermas argued that in his contemporary world, rationalisation has not proceeded at an equal rate; the social system has rationalised more rapidly than the life world. As a result, the life world has come to be dominated by a rationalized social system. In the introduction I spoke about the difficulties that politicians experience when they try to explain the “hamster stopping the building of a highway”. Other examples mentioned in this Chapter were related to bad service delivery or alienation by the feeling that the computer has taken over control. These are illustrations of Habermas’s gap analyses as described above. I take the position that the alienation that can be caused by bad digitalisation of government services illustrates an increase of the gap between ‘Lebenswelt’ and the ‘public sphere’ as defined by Habermas. If the gap between ‘Lebenswelt’ and the formal structure becomes too
great, the problem of legitimation increases, so argues Habermas. Seyla Benhabib describes the problem eloquently while reviewing the latest book of Habermas in 2011, “as more and more regulative acts were issued by administrative agencies and put into effect without legislative debate and deliberation, the legislative institutions fell into danger of losing their deliberative character and becoming empty chambers. The democratic public became a phantom public power” (Benhabib on Habermas, p. 127, 1997). One may state that Habermas was an optimist, having left the Frankfurter Schule because of its sceptical and increasingly pessimistic atmosphere. Habermas was strongly influenced by the Nuremberg trials after the WO II and dedicated his life to the search for a viable society. We will use his insights to see whether technology and especially internet technology will be able to support the “deliberative democracy” or “discursive democracy” he helped to design. Habermas was followed by theorists like John Rawls and Joshua Cohen who carried the ideas forward into political theory (Rawls, a Theory of justice, 1970) whose research was more recently renewed in eParticipation, eDemocracy and participative GIS. These lines of research focus more on the question of democracy itself, rather than on the gap between laws, regulations and citizens or business managers, however. In contrast, the goal in this thesis is to contribute to the design theory of accessibility and knowability of laws and improving legitimacy. Mathijsen mentions Habermas as relevant for research on the communicative aspects of legislation as well:

“Habermas ‘theorie des communicatieve handlen’, which deals with linguistic coordination mechanisms in social systems, offers a good perspective on the legal system as a mechanism for coordination in society. And some of Habermas’s communication concepts such as normative content, mutual agreement and authority, directly apply to important legal concepts” (Mathijsen, 1999, P.3). I have supported the theory that proper design using technologies like digitalisation and the Internet could support the communicative action to bridge the legitimation issues arising from bad case assessment services, inconsistent planning and weak explanation of planning decisions made. The costs of a too slow modernisation of access to and relevant digitalisation of the legal “system–as-a–service” may well be considerable.

[…] “Whatever form law and legal procedure may come to assume under the impact of these various influences, it will be inevitable that, as a result of technical and economic developments, the legal ignorance of laymen will increase. The use of jurors and similar lay judges will not suffice to stop the continuous growth of technical elements in the law and hence thereof its character as a specialists’ domain. Nor can it prevent the spread of the notion that the law is a rational technical apparatus which is continually transformable in the light of expediential considerations (zwechrational) and devoid of sanctity or content.” […] (Habermas p.350).

Here we see the alienation in relation to law as Marcuse and others have warned us for described in more general terms.
Legitimation and the technology of the digital age

So, what can contemporary theory tell us about digitalisation and ICT-methods? Is ICT a threat or a burden? Habermas clearly shows the danger of technologies or “automation” when people are alienated from a clear-cut relation between a rule set for the general public and their goals as individuals. He provides a theoretical back ground for the ‘moments of bewilderment’ and ‘the breach in the fabric of commitment’ to comply with the rules set by government’ as described in Chapter [I] about ‘Le Contrat Social’.

Some research has been done to identify the problems of rationalisation and bureaucracies in the context of the information age. This research is inevitably performed around Weber. Zuurmond investigated the effect of information technology as a development process on the rationale of bureaucratization in the meaning of Weber. Zuurmond tested the strength of Weber’s ideal type of rational legal bureaucracies as an important strategy for western development in the face of the information age. He sets out by describing Weber’s theory on bureaucratic authority development over traditional authority or charismatic authority development as still unchallenged in its essential claims (Zuurmond 1994 and Vroom 1994) and then questions the general opinion on Weber’s view on bureaucracies as a favourable course for societal development. Careful reading of Weber unveils his doubts about the disenchanted world where individual decision making is replaced by ruthless and inflexible procedures (now turned into computerised expert systems according to Zuurmond). Without enough balancing checks, the values and norms solidified in procedures and forms would estrange the citizen from its government. Quoting Lipsky’s street level bureaucrat and using the social benefit agencies as an example, Zuurmond points out that bureaucracies are much more than rational machines. They are carriers of cultural values, purposes, outlook and ceremonies and act as conservator of the values of a culture in an organic way. In his view, it is therefore important to investigate the influence of digital technologies on the ideal type of the bureaucracy.

Like Bovens, I did indeed find evidence that in the current age, the “digital bureaucrats” or ‘system bureaucrats’ have a vital role in the translation from consensus based plan texts produced by the Regional Council into “go-and-no-go-area’s” on a digital map for end users, (see chapter [IX] and [XI]).

The research performed by Zuurmond aims at the normative aspect of information technology as a measurement of development. Zuurmond (1994) only hints at the political side of information availability and increased transparency (Zuurmond p. 67) Zuurmond tends to address the information processing part of information and communications technologies more than the communication or explanatory part. Communication is defined as a cross-organisational border information exchange; not as human discourse and ‘Lebenswelt’ and ‘Offentlichkeit’ in the sense of Habermas (Zuurmond, 1994, p. 45). Zuurmond addresses the eGovernment side of implementation agencies B) and not accessibility A), or discourse or policy formulation C). At that time the communication wave caused by the internet (email, MSN and social media like Facebook and twitter) had yet to start and
Google did not yet exist, and Zuurmond as well as Frissen, Crozier, Child and Danziger, were interested in the extent to which the technology of information systems would strengthen the negative rational aspect of bureaucracies. Could the ideal rational information system be defined? Zuurmond validates the ideal type to measure the relation between more control and a higher degree of information. He does not elaborate on the regulative side of Weber’s rational legal bureaucracy. Rules and regulations are a means to an end in management and control, but they are not addressed as such in themselves and Zuurmond mentions in his references around the object of investigation, that the social benefit agencies and “equality for each before the law” is one of his attributes of investigation, (Zuurmond, p.151, 196). Zuurmond did find empirically, that more and better information does not automatically lead to a more positive attitude towards the available information, since people are much more aware of the possible faults after intensive automation projects. The accessibility, transparency and co-creation of the rules by means of information technology is therefore not an issue in his research, but he does point out the problem of information seen as the top-down instrument of management-only as described by Nolan (Zuurmond 1994, p. 53). He also points to the co-construction of information as a jointly and politically created reality rather than a positivistic top-down tool. Here we are back to the familiar territory since Habermas followed the same line of thought applied to law in his 500+ page treatment of Weber’s rational theory.

“Of course Weber, in line with the legal positivism of his time, particularly stressed the second moment, that is, the basic idea that any law whatever can be created and modified by formal enactment” (Habermas, ‘A theory of communicative action’ p. 226, 1984). In the time of Weber, it appears that authority was simply authority. Rules were rules as long as the authority was legitimate.

There are a number of issues regarding the co-creation of information and the role of governments. Weber pointed out already in the twenties of the last century, that running a bureaucracy requires ‘fachwissen’. The reliance on ‘amateurs’ would lead to problems with the application of technology and distributive logistics. “Man hat nur die Wahl zwischen „Bureauratisierung” und „Dilettantisierung” der Verwaltung, und das große Mittel der Ueberlegenheit der bureaucratischen Verwaltung ist: Fachwissen, dessen völlige Unentbehrlichkeit durch die moderne Technik und Oekonomik der Güterbeschaffung bedingt wird”, translates as: “One only has the choice between ‘bureaucratisation’ and ‘amateurism’ of governance and the great advantage of bureaucratic governance is: ‘Craftsmanship’, which total necessity is defined by modern technology and the logistics of goods supply.” (Max Weber, Wirtschaft und gesellschaft, 1921, p. 128).

This observation of Weber is fascinating. Based on his ideas, one could defend the theory that a bureaucracy is handled best in the hands of that institute – which can be the general public using social media, corporate companies or the public institutions – that is most suitable for logistics and the management of information technology. I will return to this debate in Chapter [XI]. Both Habermas and Zuurmond have little belief in the “formal legalistic” approach as the single vehicle for rationalisation. They seek answers elsewhere, such as in communication and the creation process of information. This creation process
has been sparked to great heights as a co-creation process since the growth of ‘social media’. Werner Ulrich, a direct discussion partner of Habermas, stated: [...] “To mention just a few such competencies that come to mind, citizens everywhere are learning to make better use of the public media, including the new possibilities of information access and exchange through world-wide communication networks; to make the most of the available means of legal action and, at times, civil disobedience; to engage themselves in participative forms of inquiry and planning such as citizens’ action groups, planning cells, citizen reports, stakeholder evaluation, and participatory action research; and, of most interest here, to increase their critical competence vis-à-vis the rationality claims raised by vested interests or by the experts in their services. It is certainly significant that the old idea of a civil society currently enjoys a remarkable renaissance.” [...] (Werner Ulrich, 2011 http://wulrich.com/cst_brief.html).

Ulrich has struggled with the idealistic framework of Habermas and has written extensively about design methods and information systems that would support “discursive action” in general sociologic terms. Habermas himself was said to change from strong doubts in 2006 (Stuart Geiger, 2009) about the value of the internet as a means for Public space and open discourse towards a more positive inclination in 2011.

Legitimacy and institutional theory

An approach on legitimacy that carries us one step further towards the operationalisation from the position that legitimacy of law occurs because of the acceptance of its underlying logic by the citizens and Habermas’s views on open discourse towards the design of technology, is the approach based on institutional theory provided by Oosterhout. Oosterhout sets out to describe the ‘institutional’ viewpoint on legitimacy by listing some different types of institutional facts within institutional theory (Oosterhout, 2002). First he makes a distinction between brute facts and institutional facts using the example of a simple bus ticket. The bus ticket is the result of a whole layering of institutional facts, that go far beyond its piece-of-paper qualities. He states that institutional facts can exist only by virtue of us accepting them as such, that is, by the grace of our collective intention imposing ‘status-functions’ on events, objects or symbols over and above the natural properties (Oosterhout, P127). [...] The third branch of institutional theory has been labelled the ‘cognitive pillar’, because of its emphasis on the social constraints contained within and working through processes of human cognition. The central premise is that individual actors are necessarily constrained in the way they understand social reality and themselves as actors within that reality. Thus the focus here is on the way that meaning and representations of self and social reality are continuously shaped and re-enacted through ongoing social interaction. Like the normative pillar, the cognitive view of institutions asks attention for the centrality of rule following in both the functioning and reproduction of institution. While normative institutional theory primarily involves normative expectations and practical rules, the cognitive branch of institutional theory is concerned with the ‘taken for grantedness’ of everyday life and the (theoretical) rules constitutive of both social reality and our understanding of it. If there is a dominant logic to be associated with this branch of institutional theory it is a logic according to which belief, meaning and understanding are fixated through ongoing social interaction[...]

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Oosterhof seems to reach the same point of Habermas, that is, that legitimacy is a process of speech acts and re-definition of meaning. What he adds, is the notion increasing stability of that ‘taken for grantedness’ (institutionalisation as a legitimation process), without which no society can function and which provides a bridging mechanism from the formal world of norms and rules to our everyday life (the lebenswelt). Where Habermas seeks legitimacy in improvement of speech acts, Oosterhout points at those objects and their value as an arena of continuous cognition. This view provides some theoretical base for technology as the subject of adding legitimacy by a process of gradually increasing shared cognition by the actors.

One important part that Oosterhout points out is that any government involved in the rule making process should be perceived as acting ‘responsible’ by the actors involved. He combines the two concepts of “responsibility” and actors who are constantly contributing taken for grantedness to an artefact or agent t: [...] there are three alternative mechanisms by which the characteristic ‘responsible’ can be socially imposed on actors and agents. Thus our cognitive understanding of responsibility, firstly, explains how social processes constitutive of human cognition label and fixate the status function of responsible for X on what is or can be understood as the intentional cause of X. Our regulative understanding of responsibility, secondly, focuses on how considerations of efficacy in upholding certain normative expectations (N) in a given context (C) are decisive in imposing the characteristic ‘responsible’ for the realisation of (N) on actors or authoritative agents interacting with (C). Our normative understanding of responsibility, finally, points at the role that normative and valuational considerations play in imposing the status function responsible on actors [...] (Oosterhout, P133, 2002).

From the above I can derive that there are considerable challenges involved if the characteristic ‘responsible’ has to be attributed to actors in a co-regulation context. Still, this achievement is exactly what we need to design as a specification of the co-regulation system. I will return to these concepts in Chapter [VI].

**Conclusion [C]**

The exploration described above leads to the notion of ICT-enhanced discourse and ‘harmonisation of plans of action’. I call this approach the co-creation of law. This approach combines the need for transparency with the perceived fair balancing of interests by government as well. It also combines new ICT capabilities such as social media with the citizen taking co-ownership of law making.
Combining the challenges A, B and C

The analysis thus far has considered some of the core social theories related to rationality and bureaucracies in the last century and has clarified the tensions between (over-)increasing rationality (perceived as disenchanted institutionalisation, ineffective bureaucracy or unbalanced ruling) and the citizen’s need to be assured of the correct and legitimate intentions of the rules (and thus the rulers) and also of the regulations in everyday life. How to adequately support this is described as challenge A. A further question addresses what legal service infrastructure could support the legal infrastructure. This is described as challenge B: an eGovernment service providing legal effect planning. The last challenge addresses the balancing of interests. Habermas points at ‘harmonisation of plans of action’ on the basis of a ‘common situation definition’. Zuurmond and others have addressed the issue of ICT and bureaucracies and points at co-creation of information rather than a top-down phenomenon directed by management or government. I recognise here a possible solution area identified by those theorists through the notion of ‘public discourse’: explanation, increased participation, and enhanced communication about balancing the individual interest versus the collective interest. This is described as challenge C.

Joining these challenges we get an overall picture on how to enhance legitimacy, see figure 14.
Figure 13: Three gaps combined.
Research Plan A, B and C

The three contributions that technology could provide for legitimacy of law have been described in three lead research questions, that could be operationalised into three experiments. Those experiments as a whole could be viewed as the overall research plan for this thesis.

- **Legitimacy from the perception of the individual user of the system:** knowledge in the form of access and case assessment support.

**Legitimacy Type I – Experiment [I]**

Legitimacy challenge of knowability.
Question: potential of technology to support government to offer access and case assessment for the citizen need of legal advice about rights obligations and opportunities.
Example: the business manager seeking answers
Solution design: maps

- **Legitimacy from the perception of the legal planner: feasibility, implementation and effect measurement: support for legal planning and legal servicing support.**

**Legitimacy Type II – Experiment [II]**

Legitimacy in the stage of legal planning, effect measurement, case handling, case assessment and opportunity finding.
Question: could technology support a legal effect planning infrastructure?
Question: can this be done in a feasible, cost-effective and efficient way?
Solution design: service infrastructure

- **Legitimacy from the perception of those that require transparency while balancing interests: support for participation and co-regulation.**

**Legitimacy Type III – Experiment [III]**

Legitimacy of Balancing individual interest versus collective interest: policy formulation, policymaking
Question: could technology support harmonization of plans??
Example: stakeholders seeking solution for NIMBY problem (like windmills)
Solution design: co-regulation to produce norms and alignment of interests.
“Use of the internet has both broadened and fragmented the contexts of communication. This is why the internet can have a subversive effect on intellectual life in authoritarian regimes. But at the same time, the less formal, horizontal cross-linking of communication channels weakens the achievements of traditional media. This focuses the attention of an anonymous and dispersed public on select topics and information, allowing citizens to concentrate on the same critically filtered issues and journalistic pieces at any given time. The price we pay for the growth in egalitarianism offered by the internet is the decentralized access to unedited stories. In this medium, contributions by intellectuals lose their power to create a focus.”

(Habermas, quote from Die Zeit, 2006).
Experiment [I]

Legal knowability based on maps
“What gives the situation of the ‘civilised man’ as opposed to that of a ‘savage’, its specific rational quality is the generally instilled belief that the conditions of his everyday life – be it the train or the elevator or money or the court or the military or medicine – are in principle of a rational nature, that is, are human artefacts capable of being rationally known, created, controlled and this has some important consequences for the character of consensus.”

Max Weber as explained by Ralph Dahrendorf

About Section 2

The first two chapters dealt with the outline of the research question, the theoretical background and the scoping. This second section of the dissertation is dedicated to the search for design requirements and enabling technologies to provide knowability, effect planning and opportunity finding. What technology is promising? Chapter [III] explores the technology of maps and GIS to find the mechanisms behind knowability. What makes digital maps so special? This exploration leads to testing and further explorations. Users indicate a need for alternative finding functionality to assist them in finding the relevant information for what their needs. What would a map-based interface for such legal services look like? What are the use case scenarios? Government agencies doubt the feasibility and maintainability of such a service and such a service requires a consistent legal infrastructure. What is an appropriate infrastructure to make it maintainable? How does it fit in the context of other eGovernment theories and practices? What are the problems with the technologies? This leads us to explore the design of a legal-effect planning infrastructure that is in alignment with the environmental planning infrastructure of the regional authorities. Chapter [IV] is also about the ‘engine under the hood’ of user centred legal service provision and opportunity finding that should help to enhance legitimacy. Do the known standards and architecture principles work in the reality of public administration? Is it feasible to build a reasoning engine that provides help to decision makers? Some of the technical description is quite elaborate. This is done to support the claim of feasibility of the technology in the real administrative environment of operational government agencies. I will provide a description of a formal testing process to investigate the preferences of professionals between text and digital maps in Chapter [V]. The study described in that chapter is not just addressing typical interface design issues, but also broader notions such as ‘affordances’ (see Gibson 1982). Going beyond traditional user-interface testing proved to be a challenge and I will explain the methodological issues and outcomes of a commonly used formal measurement method. Then I will draw some conclusions regarding the assumptions about usefulness of maps, the methods chosen and the legal implementation issues.
Legal Service design and technology:  
*are maps a technical solution for case assessment and knowability?*

In Chapter [II], I have described the shift towards a more user centred orientation of the legislature. This user-centeredness outs in:
- A view on the citizen as a user of legislation;
- An awareness of the need to create legislation that could be implemented in real-life context.

Also I observed a shift in the technical challenge from accessibility towards knowability. Knowability was defined there as: ‘the possibility to put rules into the context of the use case’. I have described in that chapter the experience of the users that were involved with the creation of www.overheid.nl. At that time there was a huge gap between the information systems that should help the users looking for solution for their legal issues and the users’ needs. The solutions typically consisted of offering databases enabling access to the legal sources. What the user actually needed was legislation in the context of their use cases. In order to achieve this we had to reconceptualise the problem of the user.

Having defined the issues around the design of a legal service system in chapter II, I can now start to describe how I examined ideas about the technologies to assist in the accessibility.

Towards maps

At first, my design team decided to follow the lead of earlier engineers and build traditional text retrieval systems with additional functionality to improve access to legal texts.

The ideas about the application of radical other technological approaches gradually increased in strength and conviction. The most powerful of those ideas was the notion that maps could assist with some of the troublesome aspects of a text database as the ideal expert system for legal services in the domain at hand. Maps and lawyers do not seem to encounter each other often and they did certainly not before TomTom and Google existed. (Peters, 2007). This step, perhaps without question for environmentally oriented practices, requires substantiation in the legal world. Below I will explore some of the outlines and theories put forward by researchers about user interfaces and the potential of the contribution of
maps. I will start with a short historical overview of the use of maps. This will be followed by outlining the reasons why – from the perspective of expert-systems and related models – maps could be relevant for solving the legal challenges in a spatial contexts. I will then proceed with the use case of the business manager that is forced to find another location for his business, as introduced in chapter I.

In the world of internet technologies, mapping technologies are often referred to as GIS or ‘Geographical Information Systems’. Digital maps or Geographical information Systems may well be more than a superficial (navigation) addition to an expert system approach. For the last 10 years the term ‘Spatial Data Infrastructures’ has emerged. According to Nerbert, “a spatial data infrastructure (SDI) is defined as the infrastructure that provides the framework for the optimization of the creation, maintenance and distribution of geographic information (and environmental data by specialization) at different organization levels (e.g., regional, national, or global level) and involving both public and private institutions”. In this line, the European Commission launched INSPIRE (INfrastructure for SPatial InfoRmation in Europe, Nerbert D. 2004).

Spatial Data Infrastructures have their roots in land administrations (Bregt, 2008, van Loenen 2009) Land administrations or cadastres (from Catastrum or ‘land description’), deal with land ownership, which is a very legalistic issue in itself, since its purpose was mostly to obtain taxes. The visualisation of landownership may be one of the eldest uses of information infrastructures (Sweden 1227, see figure below). Maps are also used to formally describe land use by the Dutch Central bureau of Statistics (CBS).

**Figure 1: One of the earliest Cadastre maps in The Netherlands:** Johannes Dou, Cartographer, Hoogheemraadschap Rijnland collection of Rijnsburger abdij, 1662.
To retrieve relevant information in the context of spatial challenges, like the use case of the LPG business manager, maps seem to have an advantage over text. A map seems better equipped to visualise ‘the affected area’ when applying regulations to a case than text. The ‘affected area’ is also probably much closer to the world of the user than a juridical text could ever be. The map ‘renders’ or compiles the legal formal representation into a visual effect-picture. The term ‘infrastructure’ in SDI refers to the notion of a common utility for general purposes. This notion will come to the fore in Chapter [V] where a legal service architecture will be discussed.

Maps and expert systems

In the mid nineteen eighties expert systems became quite popular also in the legal field. It was believed that access to law could be improved by taking an expert system approach (see for example Leith and Mcullagh, 2004). The authors state, that the regulative environment or context has to be configured like a legal expert system for the selected typical user groups. Briefly stated, expert systems consist of a number of components (Valente 1999) see fig 2:

Figure 2: expert system basic (Valente, 1999).

During my preliminary investigations for Experiment [I] that will be described later in this Chapter, I found that our business users did not much like the question-and-answer text-based expert system approach, that was commonly taken. During case assessment, they wanted to explore or ‘play with’ the possibilities and data in their own way and they did not want to be narrowed by someone else’s scenario. This notion of ‘playing’ or browsing was an inklng of the complexity of needs of the users of legal services to us as designers. So we had to look for another form of expert systems.
The design assumption about knowability is that maps provide a better technological support for knowledge acquisition, organizing the content in the knowledge-base and provide query articulation and representation in the user interface. A second design assumption is that the accessibility is improved because of the possibilities that map-based user interface offers to zoom in and out, to create an overview over a large region as well as to create a multifaceted ‘picture’ of the opportunities for the case. A third design assumption is that maps could show the contextual information users need in our use case. According to Polanyi Knowledge is partly contextually defined: “Tacit inference, ‘mutual adjustment’ and a shared process of tacitly adjusting to each other’s perspectives, are terms used by Polanyi that describe this context between people sharing practice and knowledge, but these terms could also be applied to systems. (Personal Knowledge, Polanyi, p. 205, 1958, R.Broom on Polanyi, p.9, 2007). Offering context by using maps thus allowing users to access and use tacit knowledge should help us to reduce the knowability gap described before (see figure 3).

Figure 3: The knowability gap and maps to support use case contextual information.

Legislation and Legal source  Knowability GAP  Use Case Context

Maps as Technology Support

What would make law and maps such a good match? Are maps only a better visualisation than text, i.e. would a map-based system provide a better support for human information processing given the problem solving context? And would a map-based system also help us to improve production rule systems allowing users apply human heuristic problem solving? Does map-based digital access to legislation fundamentally change the character of ‘traditional’ expert systems? What happens when we take a closer look at legislation?

The impact of using maps on an expert systems’ interface as well as on its knowledge base can best be explained by using the Model, View, Controller Model (MVC) that is widely used as architectural framework within different programming paradigms.
The MVC model shown in the figure (Fowler, 2006) helps to clarify at least two aspects that maps seem to contribute to, namely:

- A map-based interface provides the functionality to **view juridical constraints** as an integral whole, especially when these legal problems are related to Spatial constraints.
- A map-based interface provides the functionality to **manipulate the model** that sits behind the views which alters the variables, in this case the variables related to the opportunity finding activities for the business manager.

The business manager, seeking an alternative location for his Gas station, can manipulate the parameters for his LPG station (region, minimal traffic, proximity of other LPG stations, and cities), i.e. updating the model, and match those parameters with legal constraint variables (NO emission allowances, population proximities, permits, spatial plans). The changes in the model creates alternative views for the users. We expect that using maps in a MVC architecture would allow the users to explore legal options, by selecting appropriate views and enhanced access to the case parameters through the model (the M of the MVC-model). Given the MVC-model and the ideas about maps, the question for the experiments is, whether maps would indeed invite the user to apply this technology for the problem at two levels of user interface and model variation.

Another reason to investigate maps and law is the fact that ‘jurisdiction’ plays an important role when applying legal rules to cases. This fact is frequently not addressed while it does have an impact on the organization of the expert systems knowledge-base. Jurisdiction
also impacts functionality needed for supporting retrieval and improving accessibility of law. The term ‘jurisdiction’ has become a very central theme throughout the research carried out for this thesis. Jurisdiction relates legislation to a place on the map. Legislation is often expressed as a set of norms. Jurisdiction is the area where the norms apply. “Legislation always has a spatial component, mediated through the concept of jurisdiction.” (Winkels, 2007).

For that reason, the jurisdiction always has a geographical component. Dutch law is related to the Dutch country. Laws regarding trees apply on woodland areas. A map can be used as a graphical representation of where norms hold. In our approach ‘jurisdiction’ was given considerable attention when deciding on both the architecture of our systems as well as on the mechanisms we developed for standardised connection between legal rules and maps. The use of ‘jurisdiction’ creates a powerful bridge between the world of legal text (the formalised logical side) and the world of maps (the visualisation and real-world manifestation) and allows for an intuitive user-interface. Maps are not only inherently relational, they are an analogue representation of our living world and therefore of our legal world.

Jurisdiction is a specific form of applicability of legal rules. Applicability is addressed in modern standards for structuring sources of law such as the CEN Metalex standard. “Very important is the concept of area of applicability, that has been added to the version 1.3 of Metalex and up.” (Winkels, 2007, Boer 2006). The land-use coding in IMRO, the information model for sharing spatial planning data in the Netherlands, also includes mechanisms for expressing elements of jurisdiction. This IMRO information model delivers a fine-grained legal model of what is allowed and what is not allowed applied to many, if not all thousands of zoning area’s within the Netherlands. Within the domain of spatial planning, the term ‘jurisdiction’ is applied in a much more fine grained application compared to other legal domains. I will return to the significance of IMRO and INSPIRE in Chapter [V] in greater detail.

In order to improve knowability of the legal issues at hand we aim at using digital maps for improving access to sources of law and interacting with legal knowledge-based systems. The first challenge is to create a mechanism for accessing sources of law at a sufficiently fine-grained level. The legal field has already a long tradition of expressing its contents in a standardised way. The content is often represented in a format of textual articles, textual sub articles and references that help the professionals to apply norms on a case. These structural elements can also be found in the CEN Metalex standard, if in a more abstract way. However if we want to access these sources via maps we should explore what theory exists about the possibilities of maps as a type of user interface and how we can we connect between these sources of law and maps.

Theoretical base for case assessment usability: 
*affordances and maps*

Usability of the technologies used has been defined as a relevant part of knowability and accessibility. In all aspects of legitimacy, ‘Grimmelikhuijsen (2012) addresses usability as an aspect of user-centred services.

**Figure 5: maps increase usability and expert system knowledge acquisition.**

Gibson’s ‘Theory of Affordance’ (Gibson 1977, Norman 1988, Peters and Wilson 2003) and his terminology around ‘action possibilities’ provides a theoretical framework to identify the progress made while learning with our users to improve the assets of maps as a legal accessibility tool.
Gibson indicates aspects of objects that ‘afford’ action possibilities independently of the subject’s experience or culture. Norman introduces “perceived action possibilities” where experience from the subject and the extent to which the object conveys and makes visible its action capabilities, both come into play (Norman ‘1983). “An aspect of an artefact’s design suggests how it is to be used.” When the law can be regarded as an instrument to tell the citizen what is and is not allowed, then text could be considered as an object with less conveying power concerning the permissions and prohibitions (in the perception of the user). McGregener stresses the difference between usefulness and usability: [...] “A designer must also be concerned with creating the useful actions of the design, creating what is truly possible in the design. A useful design contains the right functions required for users to perform their jobs efficiently and to accomplish their goals. The usefulness of a design is determined by what the design affords (that is, the possibilities for action in the design) and whether these affordances match the goals of the user and allow the necessary work to be accomplished. The usability of a design can be enhanced by clearly designing the perceptual information that specifies these affordances.” [...] (Gregener, 2000). When my team was asked to build, from scratch, a legal system properly designed for business decision makers and for professionals, then text might not have been the best choice to support them in an efficient way, especially if many regulations had a spatial component (Peters and Janssen, 2005; Peters and van Engers, 2004). The English phrasing ‘mapping onto’ in itself suggests some special affordances of the map as a knowledge visualisation tool. Keates has been able to convey the magic of maps already in 1996. He separated detection, discrimination, identification, recognition, and interpretation: [...] “Initially, the map reader has to be able to respond to what is visible on the map, e.g., the map symbols have to be sufficiently stimulating if they are detectable. The reader also has to be able to differentiate between symbols in order to discriminate between them. These two processes can take place regardless of whether the map reader understands the symbols, whereas identification is a learned behavior. This means that map reader is able to say what a specific symbol means or can name it. In recognition, readers are able to say that something looks familiar to them. Interpretation is the stage at which the perception information is further processed by map readers in order to resolve particular tasks.” (Keates 1996). In 1995 a number of scientists were engaged
in a debate about the significance of the technological possibilities of Geographic information systems (GIS) with respect to social relations (Picles, 1995). Pickles links GIS development to socio-economic developments, where this technology can act as a two-sided sword. In his paper about participative GIS, McAll provides a list of attributes concerning GIS: [...] “There are value-adding functionalities giving GIS strong advantages over paper mapping, salient of which is overlaying, along with spatial analysis capabilities, spatial scaling (scale comparisons, zooming-in), time series for temporal comparisons, and many visualization options. Web mapping opens new potentials, with hyperlinks to information or other images, magnified maps or photos, interactive visualization, or temporal animation.” (McAll, 2003, p.570). Furthermore, a more recent Irish government manual concerning the European directive of INSPIRE states: [...] “The application of GIS in public participation processes has the potential to: provide alternative means to involve and engage the public; effectively communicate in a graphic and clear manner potential problems and analysis results; improve the understanding of the opportunities and effects of alternatives/scenarios; and modify the perception of a problem.” (Delcampo, GISEA manual, 2009). Both authors point at an interesting affordance of maps that is the action possibility of ‘comparison capability’. According to those authors it is much easier to compare two (coloured) maps with each other than to compare two policy documents with each other. During our initial discussion with spatial planners, their claims were confirmed. These spatial planners stated that the act of comparing large pieces of text that refer to other articles and more large pieces of text is more troublesome to the user if one compares it with two differently coloured and adjacent area’s on a map (e.g depicting “build” and “green”) and clicking on the area to retrieve the relevant article. In my research I examined this claim that maps are a supporting technology for legal case assessment. In practice spatial planners used ‘primitive’ solutions, such as a paper-based map and coloured needles, to enable their complex tasks (see figure 7.).

Figure 7: When someone sees a wall map with pins in a chocolate shop, for example, they are likely to be incited to the response-sequence of participating in the mapping effort. (MacEachren, 1995).
Claim:
I conclude from theory that digital map technology better supports case assessment, query articulation, and visualisation, and thereby improves knowability of certain types of legal sources than text-based systems. This is based on the affordance of its viewing capabilities, its capability to provide an overview of the area, its comparison capability and its capability to control the underlying model in the context of spatial alternative seeking challenges. The legitimacy challenge is now transformed into a usability challenge.

If my research would show that this claim holds I wouldn’t be surprised, because pictorial thinking and expressing oneself using pictures precedes the use of token-based languages.

*Long before writing was developed in Sumeria (c. 5000 BC) came the paintings of Lascuax (c. 25000 BC) and some simple maps (c. 17 000 BP)* Micheal Wood, 2003.

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**Figure 8:** Sumerian signs, usually considered to be the first example of writing (c. 5000 BC).

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**Figure 9:** Cave drawings at Lasceaux, one of the first maps, in this case a map of the important stars (c. 25,000 BC).

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3.1. Access to legal sources, Experiment [I]

3.1.1. Introduction to Experiment [I]

In earlier paragraphs, I have concluded that the available theories on usability and affordances, GIS and access to law all suggest that the intuition, that maps could indeed be helpful with legal case assessment, was plausible. In the following chapters, I will describe the design of a map-based system that we tested empirically with user groups and client groups to see whether our map-based system confirms these claims. The map-based system allowed for a different way of problem solving compared to the then existing practice.

A map-based system that we aimed to design didn’t exist at that time, i.e. in 2004. We chose an explorative approach for our system design. This would allow us to discover more about the needs and behaviour of the user group while working collaboratively on the design and development of the system which also allowed us to determine what technology should be developed. While developing a ‘better solution’ one gradually uncovers the models behind improvements, but this is by no means a sequential discovery process, rather, it is a cycle of iterations. Therefore, we used a qualitative investigation method that helped us to conceptualise the problem, while working on the solution for it.

Based on our previous experiences and my literature research we worked on the assumption that a digital map-based solution would improve the existing practice. This lead to a hypothesis that I used in the PhD-thesis research:

The hypothesis is, that users would be better served by a digital map-based system to identify legally allowed opportunities in relation to their business activities and goals (case assessment), than by paper-based or database systems.

Operationalisation:
This explorative experiment was conducted in five phases:
- To determine the user groups and user group needs
- To build and test a mock-up system (stage 1)
- To test the system with a client user group
- To build a proof-of-concept based on the feedback (stage 2)
- To discuss the system with an expert test group
The mock-up stage fits with the tradition of designing ICT systems with iterative steps.

3.1.2. The user needs of experiment [I]

This first experiment was organised in close collaboration with The Province of South Holland. This is the largest of all Dutch regional authorities with a mandate to solve large-scale conflicts of interests in planning, allocation, infrastructure and environment. This region counted 91 municipalities at that moment, 50 of which were larger than 30,000
inhabitants. This province was particularly interesting for the experiment because it wanted to start implementing IMRO, a new digital standard for the description of spatial plans at that time in 2003. Spatial plans play an important role in the legal process of allowing permits for business activities.

The plan acts as a frame of reference for all actors involved in the decision process that determines the degrees of freedom for such activities. The Province of South Holland is a relatively large and densely populated area of Holland where many regulations affect the same area. This part of Netherlands is densely populated with a fine complex network of regulations governing permissions and prohibitions. The legal network has a production side and an enforcement side to it. Many players are involved in those two processes. One of the functions of the regional authorities in the Netherlands is to supervise the zoning plans or development plans of all the municipalities in their area. The zoning plans are the result of a time-consuming consensus process, and so is the process of obtaining a zoning or development permit. The permit structure is one of the major targets of Dutch government programs aiming at the reduction of administrative burdens. The process of individual case assessment can take years and a range of advisors is involved in coaching individuals and governmental bodies through lengthily juridical procedures. Citizens and businesses are represented by architects, lawyers and citizen representative organisations. All stakeholders have the right of oppose a permit requests (in 2004). The judgement of the city council is again open to appeal through the provincial council and the National state council (Raad van State, status WRO 2003).

Our explorative expert interviews, preceding this research, with government officials indicated that municipalities are often “swarmed” by consultancy agencies, urban design & planning institutes and legal planners. The complexity of the intertwined regulations is such that the average business manager or citizen cannot hope to be successful in identifying the straight answer to simple legal assessment questions.

3.1.3. The business manager needs

This problem of intertwined regulations occurs especially in the situation of case assessment. The business manager requires answers and help. Current systems ‘speak the language’ of policymakers, vague consensus documents and unclear relations between the real world reality and the case at hand). As a result, the business manager with his business opportunity or case assessment problem (lebenswelt in terms of Habermas) is

59 The hierarchical nature of supervision changed over the course of the research period towards a more equal and collaborative relationship between regional authorities and municipalities due to a legal change in the spatial law. The possibilities to object to zoning plans were gradually limited as well.

60 See also the ACTAL proramme: http://www.minderadministratievalasten.nl/intro.html

61 Piet Hein de Sonnaville, director of Atos Interim Management: even claims that our government has become totally dependent on specialists like urban designers with questionable consequences for the democratic values

62 Quote from Jolanka van der Perk, legal expert at the Flevoland Province
The permit-request process, its peculiarities and its central role in the legal steps that a business manager has to take to reach his goals, makes permits an ideal problem space for the experiment.

Looking for answers, a business manager is usually brought to the website or to the front-desk of the municipality itself. Most attempts to get a definite answer will take six months or more (Peters and Wilson 2004, Peters and van Engers, 2004, quoting Mr F., advisor to BOVAG63). The answer at the city office counter or – in the case of a more complex permits – as a result of a permit process protocol involving several committees and advisors, will often be a plain “yes” or “no”. While the decision will be explained by the municipality it doesn’t provide. In the case of a “no”, the business manager has to start all over again with a new plan in another city with another six month waiting period (status 2003). The costs of such an endeavour are beyond reasonable levels for a simple question of permission or inhibition. My aim was to develop a more user-centred service-oriented approach, answering the ‘where-can-I- do-this? -question, which seems to be non-existent at that time. The manager was given a “no” or a “yes”, and a ‘definitely not here’, but there was no facility to support his need for alternative solutions (Moles, 1987, p.217 quoted in Bench Capon, 1997). While automated support for case assessment and impact analyses was already available, specifically in the areas of tax or merger law, hardly any expert systems provided alternatives or a way to balance interests rather than providing a “yes/no” answer to a business manager. (Crombach quoted in Bench Capon 1995, Kees de Vey, p.54. 1997).

Our interviews indicated that, in the use-case scenario of a business manager who has to re-locate an LPG station, the costs were such that the BOVAG umbrella organisation installed a dedicated “permit chaser” to speed up the process.

In this stage of my research I tried to find a solution for a better support of case assessment, satisfying the following questions:

**Figure 10: Legal case assessment questions.**

The case assessment question from a business perspective.

1. ‘Is this allowed?’
2. ‘Will this be allowed?
3. ‘Is this allowed here?’
4. ‘Which legal regime allows this, where?’

We additionally posed ourselves the question;
5. ‘Can such a technology be built?’

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63 BOVAG: http://www.bovag.nl/ represents 11.000 members in the Dutch automobile industry
3.2. Users involved in Experiment [I], stage [I]

The assumption about the choice of users is that the problem of case assessment is mostly experienced by small and medium enterprises (SME’s) that cannot afford to maintain a legal department and for whom legal constraints are highly relevant because of the physical nature of their activities. For this reason 11 persons from this target group of enterprises were interviewed at this stage [I].

Next to the governmental information providers, I chose to interview representatives of the building sector, the environmental/heritage sector and the housing sector.

The following business managers were interviewed as type I:

- SME business manager Bovag; re-location of gas/LPG stations
- SME event manager Heineken; large out-door event organisation (>80.000)
- Notary Amersfoort; house price validation
- 2 Environmental specialists Milieudienst Leiden; soil pollution advisory agency
- Building company Arkadis; larger building- and construction company
- Cultural Heritage experts Federatie Welstand; cultural heritage consultancy

These persons were chosen because they were members of a feedback group on the province service improvement program DURP, or they were business managers with relevant use cases.

A second type of user for stage [I] was the governmental employee involved in planning and legal drafting. I interviewed seven government employees involved in planning issues, particularly with regard to policy development and policy enforcement for the region of South Holland or the municipality in that same region. They were advisors on environmental, recreational, economic and building planning at different hierarchical levels. They all provided training and consultancy services to colleagues, politicians, lawyers etc.

The interviewee, who mentioned that lawyers required training, noted that the general understanding of planning issues amongst non-expert lawyers was very low.

The persons interviewed were:  

- L. B, team leader, Department of spatial development, living and economic affairs Katwijk
- F van G, policy advisor at the Province of South Holland
- N. M, Head of Department of Spatial Planning, Province of South Holland
- P. M, senior policy enforcement spatial planning, Province of South Holland
- J. H, team leader spatial planning department, Dordrecht
- A.B, Consultant supporting the regional authority, Quarant consultancy
- M.S, team leader spatial planning, Zoetermeer

64 www.arcadis.nl  
65 Depersonalized for reasons of privacy
These persons were chosen because they were member of the service improvement team of the Province. The number of persons turned out to be more than enough to provide the necessary input to design and build the system prototypes. More input at this qualitative stage would not have improved the exploration.

3.2.1. Experimenting opportunity

The Province of South Holland had in mind to seek ways to improve the permit processing speed and service towards citizens and businesses. Our design team had the opportunity to design and build the technical solutions to improve those services. The collaboration created the opportunity to conduct a scientific experiment, which I will refer to as experiment I. To determine the answers to our explorative research question about technology (maps) as enabler of accessibility and knowability of law, the testing went through two main stages:

Stage 1: Mock up

Based on the analyses described above; for testing the legal assessment improvement we decided to build a mock-up of an expert system that would enable the business manager to find opportunities for his business activity in the local context.

Stage 2: Proof of principle with realistic data:

Based on the in-depth interviews with those business managers we built a map interface with a large amount of selected content including legal content to test our technological approach.

3.3. Interviewing method experiment [I], stage 1

The explorative study used demonstrations of the expert system mock-up prototype. These were given to the business managers interviewed to ascertain their perceptions of the offered designs and their knowledge of likely problems in legal information usage. A detailed description of the mock-up prototype will be given in the following paragraphs. The mock-up was based on a use case scenario for legal case assessment (Harry, the event organiser) which I will describe as well. In order to limit this already voluminous thesis, I have decided not to include the transcripts, summaries and coding of those interviews, but to focus on the resulting scenarios instead. These scenarios were validated through a feedback process with the interviewees. The interview transcription and summaries can however be made available upon request.

The ADDWJZER project was funded by the European commission eContent programme and provided the start opportunity for our living lab setting http://cordis.europa.eu/econtent/
3.3.1. Use case scenario design for map based legal service test

The first design outlines were mapped onto legal use case scenarios that featured a business decision maker. The user envisioned was the typical SME manager who had to enlarge his business premises or to start a new activity in a certain region. The activity had to be broken down into requirements. The list of requirements could then be mapped upon the legal attributes of areas in the region. The user should not retrieve the information by entering search phrases or key words, but by selecting regions and ticking radio boxes. The system would then show a spatial visualisation of the consequences of the case related legal constraints. A mock-up of the system was developed and tested using the use case scenario of an event organiser looking for opportunities within a whole landscape of legal constraints (see figure 11 and <>). This scenario was based upon the knowledge that was provided by a professional event organiser and mapped into the prototype system we called addwijzer.

Figure 11-A: design screens that were used to discuss the Mock up HTML screens.
We designed the initial screens of the Stage [I] assessment Mock-up (addwijzer ‘map wizard’) in the usual question-and-answering sequence style with ‘radio-boxes’ that could be ticked by the user. Based on the predesigned decision trees, the answers automatically led to next screens.

After a few questions the user could choose a map-based approach to continue his search for most likely opportunities by means of constraint visualisation (see figure 12). The attributes of the region were visualised with coloured map layers representing real factual information provided by the Province of South Holland and map layers representing regional infrastructure.

**Figure 12: visualization with colored layers depicting legal constraints.**
3.3.2. Double negation

In order to create a simple reasoning engine we made (the naïve) assumption in the first designs of experiment [I], stage [I] that most regulations and policy documents imply a prohibition of certain activities. The business manager wants to do something: a business activity, in this case the organisation of a large event. The activity is not permitted, or not permitted without an explicit permission or ‘permit’. By choosing the map layers that depicts an area - for example, an area of a high NO₂ emissions (like around roads) - it can be assumed with reasonable probability that one cannot build recreational facilities in that area. Examples of the ‘rules’ that were implemented are:

- NO₂ implies no recreation permitted and any ‘permit request’ has little chances for success;
- Environmental protection implies that production of sound is not permitted and any ‘permit request’ has little chance for success;
- ‘Near town centre’ implies no large festivities permitted and any ‘permit request’ has little chances of success.

Combining these negatives allowed us to create a ‘grey map’ of least probability for that recreational business activity. The ‘double negation’ inference method is the result of what is left on the map as open opportunity space. These remaining areas have a higher probability of receiving a positive answer on a request for permissions from that specific municipality. By gradually providing more and more relevant map layers to the user and by offering the possibility to turn that specific map layer ‘grey’ in the negation, the user would gradually be left with smaller and smaller available areas (not grey, so higher probability of success). Those areas would thereby create a map of opportunity for deeper investigation. Starting from a map with no constraints depicted, the user by ticking radio boxes will get certain information, for example the areas with NO₂ concentration (see Figure 13), and if he ticks a box indicating that his activity would produce NO₂ this will result in a map greying out areas that are not available (see Figure 14). The prototype also supported other functionality such as zooming (see Figure 15) and retrieving legal documents by selecting certain areas on the map by clicking on it (see Figure 16).

Figure 13: NO₂ concentration
Map layer along big roads activated.
Figure 14: NO2 concentration around main roads negated by graying out.

Figure 15: Mock-up: zooming in on the local level to find non negated opportunities (coloured areas in the map/not grey).
3.3.3. Protocol

1. Introduction. The interviewees were told:

The aim of the ADDWIJZER project here in Holland is to lessen the problems of legal information retrieval in the domain of spatial planning law. The expected users of the system are small law firms, citizen’s advice bureaux, firms of contractors (building and development) and architects, central and local governments, politicians and the farming community etc. The emphasis of the system is on GIS (Graphical Information Systems) tools. It will combine geographic and legal information: the users will search for information attached to objects on maps or they will search for map objects that correspond to a certain legal / special planning query. The idea is that a specialist should be able to access a portal to find out if a customer is allowed to do something specific at a specific place.

In order to create this system we need to know something about the intended users and what it is they dislike / like about existing systems and what it is they need from a system that deals with this area. For this reason and due to your experience in the field I would like to ask you some questions that might help us design a system that is suitable and would be an advantage for its users.
This was followed by an interview that lasted between 1-1.5 hours. The interview was semi-structured to maintain some common core content and follow-up questions were used to clarify points made by the interviewees. The interview was recorded on video and transcripts were saved for processing and analyses.

After the interview, the interviewees were given a demonstration of the interface. The business manager or civil servant was instructed to use the interface to work out a possible solution to the use case scenario. He was prompted to ‘talk aloud’ as he made his way through the screens and this was recorded on video. He was then asked follow-up questions and filled in a post-test questionnaire, in order to elicit further information on the usefulness of the system and his opinion about it.

Five interviewees who might find themselves in an information provider role as regional or local authority, were also given a demonstration of the information provider interface from the viewpoint of government legal information provider. The interviewees could ask as many questions as necessary during the demonstration. These five persons were then asked follow-up questions after the demonstration to get their reaction. These questions addressed typical issues that are a concern for information providers, such as content management aspects, consistency of information, maintainability and the change from service desk based to internet based governmental service provision.

The interviews were held in August and September 2003. The transcripts of the video-apes were used for the analyses.

The interviewees were given a demonstration of the end-user scenario wizard mock up described earlier, and asked to comment on it.

Those who might act as information providers to Add-Wijzer were given a demonstration of the content handling design in the Add-Wijzer prototype, and asked to comment on it.

Finally, they were asked a series of questions reflecting on what they had seen (see below). The one interviewee who carried out a test also completed a post-test questionnaire.

All the interviews were recorded on video.
Interview questions for Architect/GIS Specialist

1. Can you tell me exactly what sort of work you are involved in?
2. What type of information do you most often need access to?
3. Do you know the IMRO standard?
4. Do you ever use the Arnhem site? http://www.bis.arnhem.nl/bis2002/
5. How useful do you find it?
6. What information do you search for on it?
7. Is there any way in which that site could be improved?
8. If you need to access laws relating to planning what systems do you use?
9. What laws do you need to access? When do you use zoning plans?
10. Do you think that these systems are adequate? What features do they lack?
11. What do you do if you cannot find the information online?
12. What information do you have difficulty in accessing and does this slow you down in your work? Would you contact a third party and who would this be? Would it take a long time to find the information that you require?
13. How could a system overcome this? What would a perfect system provide you with?
14. I will now show you overheid.nl. Can you have a look at it and tell me what you think of it? Do you think it is adequate for your work? If not, how could it be improved?
15. Do you think it would be of added value to have access to local laws via a GIS map-based system similar to that of arnhem.nl?
16. Do you often need access to local municipal laws?
17. Do you think that many people would benefit from this information? Do you believe that they would be keen on accessing a system that could provide this information?
18. How do you imagine such a system would benefit you in your work?
19. What features would it include to be advantageous to you in your work?

Questions after he had seen the system

20. As a specialist, would you use it?
21. What type of data would you need for this system to work? Click and Globis
22. Do you think others would use it?
23. What categorization would you like?
24. Do you think municipal law can be categorized?
25. Do you think the veto system would work?
26. Do you have any ideas about what this system might also be useful for?

Interview questions for Event Organiser

1. Can you tell me how difficult it is to arrange a big event?
2. How many big events would you organize in a year?
3. What steps do you have to go through?
4. Do you use computers at all to help you arrange events?
5. What sites do you use?
Post-test questions

15. Would you be happy to use a system that would provide you with this information?
16. Is there any other information that it could provide you with that would make your job easier?
17. How much would it benefit you in your work?
18. Are there any features of it that you feel are not so important?
19. What features of it are very important?
20. Do you think it is a feasible idea?
21. Would you pay for this system?
22. Do you think many people would pay for this system?
23. Who would they be?
24. How much would you be willing to pay for it?

Post Test Questionnaire of Event Organiser

1. Describe two things about the site that you liked the most.
2. What did you least like about the site?
3. How could it be improved?
4. What features could be added to it to aid you in organising events?
5. What features of it did you think were less important?
6. Do you think other people would use this system? Who would they be?
7. Did anything confuse you about the system? If so how were you confused?
   Please explain.
8. What did you think of the site map?
9. Were you pleased with the results that the system gave you?
10. How useful would you find this system in a real world situation?
11. Would you pay for this system?
12. Did you like the layout and presentation of the information?
13. Did you find the system easy to use? If not, why not?
Interview questions for soil and LPG siting specialist

1. Can you tell me exactly what sort of work you are involved in and your role in BOVAC?
2. Can you tell me the sort of information you need to carry out your work as a specialist?
3. Where do you get this information? Who do you go to?
4. What sites do you use to get the information you require? Are they adequate?
5. Do you ever have difficulty in getting the information that you require? Say for example you needed to find laws related to the environment or information on recycling. Where would you go?
6. Would it take you a long time to get the information that you require? How do you think that this could be improved? How could the systems that you use be of more benefit to you? Tell me the information that you would like to have access to.
7. If not, how could they be improved?
8. I believe you used to work as a project manager on projects that deal with soil pollution problems. Can you tell me a little bit about that and the types of information that you had to source while carrying out these projects?
9. Where did you get this information?
10. Can you tell me about any other projects you have been involved in?
11. Can you explain to me the difficulties involved in re-allocation of LPG stations? What has to be considered? What is the process involved in this? How long do you have to wait? How could this be improved?

After he has seen the content handling system

12. Do you think it would be possible for an expert to fill in information into such a system that would be a distinct advantage to the user?
13. What do you think of the veto system relating to the maps

After seeing the scenario wizard mock up

14. Do you think that people would use such a system that would provide them with such information?
15. Do you think it is a feasible idea?
16. Do you think people would pay for this system?
17. Who would they be?

Interview questions for Environmentalists/Soil scientists

1. Can you tell me exactly what sort of work you are involved in?
2. Can you tell me the sort of information you need to carry out your work?
3. What steps do you take to ensure that the rules relating to the Environment are observed?
4. What sites do you find useful for accessing laws relating to the Environment?
5. How often would you connect to these sites?
6. How could they be improved to make your work easier?
7. Can you tell me about the system Globis?
8. If your job is to give out permits what process do you go through to issue these permits?
9. What kind of non-electronic information do you use?
10. Do you ever have difficulty in accessing the information that you require and if so what do you do?
11. What kind of third parties do you involve in your search?
12. How much time on average does it take to get this information?
13. If you file for a permit what are the chances that it is rejected?
14. How much time does it take you to make a new application?
15. If the chances of a rejected permit would seriously be diminished by using the ADD-WIJZER system, would you/your company be willing to pay for it?
16. What features could be included in a system that would speed up your work and make your job easier?
17. If you were to build a FAQ what subjects would it cover?
18. What are the questions that you normally get asked in your job and I would like you to give me the answers to these questions, typical questions and typical answers.
19. If you could have a perfect system designed for you to help you in your work, what elements would the system include, what features would it have?

After being shown the two prototype demonstrations

20. Would you be happy to use a system that would provide you with the information that you most regularly need to access?
21. Is there any other information that it could provide you with that would make your job easier?
22. How much would it benefit you in your work?
23. What features would really benefit you in your work
24. Do you think it is a feasible idea?

Interview questions for Notary and Notary Clerk

1. Can you tell me exactly what sort of work you are involved in?
2. Do computers play a big role in your work? What do you use them for?
3. Do you have ISDN/Cable/ADSL in your office?
4. Can you tell me the types of information you need to carry out your work?
5. What system(s) do you use in the course of your work?
6. Do you feel the systems that you use are adequate for the work that you have to carry out?
7. What features do they have that you particularly find useful?
8. What features do you feel are not so important?
9. Are there any ways in which they could be improved to make your job easier?
10. Could you bring me through an example of the sorts of queries that you perform using an online system?
11. What features do they lack? How could they be improved?
12. Do you ever have difficulty in finding the information that you need?
13. If you do have difficulty in accessing the information that you need what do you do?
14. If you would go to a third party who would that be? How much time on average does it take to get this information?
15. What features could be included in a system that would speed up your work and make your job easier?
16. How often do you use Kadaster?
17. How often do you access data in zoning?
18. Does this include ‘toelichting’
19. Is this law related and if so what type of law?
20. What type of issues do you encounter most?

**After being shown the scenario wizard mock up**

21. If the ADD-WIJZER system would cut down your investigation time would you be willing to pay for it?
22. What would you expect from such a system? What information would you want to access through this system?
23. What extra information could it provide to you that aren’t present in other systems that you have used that would be advantageous to you?
3.4. Initial results of experiment [I], stage [I] based on mock-ups

3.4.1. Findings based on structured in depth interviews

As could be expected from the wide area of professions covered by our user group, from the post-experiment interviews we identified various problems and benefits. Every user played the role of event organizer in our experiment, and we were very curious what the actual event organiser thought of our prototype. This event organiser found it very useful that ‘prohibited’ areas were masked on the map, but could not see why some sort of ‘explanation’ was not provided. “Why am I not told what is not allowed in this system?” This was also considered a major weakness of the prototype by other participants in our experiment. I concluded that this lack of explanation did undermine the legitimacy of the legal system as perceived by business managers at this stage and should be further investigated in the research that followed.

The event organiser also found it very attractive that all of the relevant information of an entire region could be provided via a single interface. The architect found it particularly useful that the system would allow him to identify archeologically sensitive areas, since the Treaty of Malta places specific requirements on architects in this aspect. Another attractive feature for architects was the ‘standardisation of municipal information’ in stage [I], coupled with the ability (e.g. when making zoning plans) to access many different types of public sector information (e.g. pollution, noise, traffic, etc.) in a single interface. These demonstrated the strength of the MVC (Model-View-Controller) paradigm that we implemented (see also fig 4 in the section <>).

Result summary stage [I]

At this stage the following results are obtained from the interviews:

- The persons interviewed encounter legal problems, mostly permit issues;
- Finding a solution that fits within the legal constraints is difficult for business managers.
- The process of legal permission takes years.
- The assumption of long sequential processes is confirmed.
- Some business managers end up in court.
- The assumption that improving access to required legal information is helpful is confirmed.

Municipal information sites are too limited to enable users to know the formal legal topics related to their business cases, thereby reducing opportunity finding and alternative finding. ‘Those sites do not tell you if the penalty for loud music after midnight is actually going to be executed and how long one can keep on partying’ is the illustrative comment from the event organiser and catering provider.

The assumption that maps could enhance opportunity finding is confirmed.

The feedback on the Mock-up Q&A expert system was both positive and negative

We were supported in our assumption that a map-interface would be considered a great help to business decision makers.

Case assessment as opportunity finding is enhanced by maps because of the number of legal players involved (pluriformity) with one location and the overview it provides for seeking opportunities.

The double negation approach appeared to have also been positively received, so this functionality or affordance would feature in the following application as well.

The three main criticisms on the initial mock-up design were as follows:

The users strongly disliked the dialogue expert system approach (see elaboration below).

The user interface was not entirely appropriate for the selected end users given the learning cure involved, although it might work if used by professionals that would use the system on a regular basis.

Complementary contextual and economic information is lacking in the prototype system but is required in addition to legal information.

Additional points of criticism included:

The participants doubted if we would be able to completely map the world into the digital system. Later we would find some similar doubts among other government actors in experiment II. This challenge of maintainability and feasibility at that time sparked the notion of a ‘legal service infrastructure’.

The feedback from the business managers provided insight into the vast complexity that would have to be organised in order to provide a good design in stage [II].
The business manager felt forced into an overly fixed line of argumentation without the possibility of changing request variables. The query articulation was over-organised, in their view. This notion was particularly explicitly voiced by the event organiser who stated that part of his job and what makes him the expert, is following rumours, gossip, lobbyists, etc. The LPG re-allocation expert stated that he required public transport opportunities and economic information, like the amount of estimated future traffic on roads. The business managers essentially prefer ‘browsing’ available information sources over the Q&A expert system approach. The objections to the Q&A expert system approach were related to the feeling of a fyke-net while going through the question-answer dialogue provided by the sequence of screens.

Figure 17: A website Q-A system like a virtual fyke net: once you travel down a lane, you are trapped in that lane...

Over the past decade a number of studies have identified the trouble of webpage users, who feel “trapped” in a sequence of forms without a notion of what choices and opportunities disappear while going from one screen to another. This was made obvious in earlier attempts to improve the websites of airliners for travellers. (Wroblewski, 2008). Carrol overviews the reasons how and why such a bad design is often achieved (Carrol, 1987). The degree of freedom in this system approach was solved in the next stage of the experiment. I will later refer to the degree of freedom to browse other relevant information as ‘browsing contextual information’.

The design team at that time decided to stop with the question-answering approach and to follow instead the path that was indicated by the business managers: giving them the data and being able to browse following their own logic.

3.4.2. Critical reflection

These early results did provide some support for the relationship between explanation, access to law and the consequent legitimacy of law, as stated in Chapter [II]. The business managers did not understand why a system would not allow for explanation of legal constraints. In fact, it irritated them, but the sample is not large enough to derive general conclusions on that aspect of the experiment.
The mock-up expert system test did show promising results for a realistic prototype. The relevance for the improved legal case assessment helping business managers and their representative organisations, such as the BOVAG, was clear. It also became evident that these map-based systems have a learning curve. This observation would be repeated in later experiments.

Design parameters of stage [II] map based prototype

The conclusions of the post experiment I held in depth interviews with the business managers and the government information providers yielded a number of additional design parameters to test the more realistic prototype system.

The main general parameters were:

¬ Enhanced navigation of maps required (zoom in zoom out, relevant map layer activation).
¬ Consistency between the covered area and relevancy of hits;
¬ Browsing rather than Q&A expert system (abundance of contextual content, smart navigation and filtering).
¬ Addition of contextual and economic information to legal knowledge (clusters of map layers to activate) and the shift of focus to content availabilit.

Additional domain related parameters included:

¬ The system has to cater for several additional clusters of information sources (Tabs).
¬ Competing expert views should be allowed, which would require the storage of previously assessed cases.

As indicated before, the interviewees tended to move from map interface to text interface without being aware, that they had radically changed from one dimension of information processing to another. I wanted to have a closer look at the precise effects of the intuitive affordances and usability with our new way of accessing complex information. To research this we set up a usability test that will be described in more detail in Chapter [IV]. Here, to identify the exact preference of maps over text based legal case assessment, we had to conclude that a more structured method would have to be used in our next experiment [II] which is presented in the next Chapter. During the interviews a number of lively discussions occurred about the potential of maps and opportunity finding for small business decision makers. To address these issues we elaborated upon the mock-up system that we have developed in Experiment I stage I. This development will be described in the next sections.
Design of Main interface for experiment [I] stage [II]

From the post-test interviews with our experts we derived a set of design parameters that we wanted to use for developing a further elaborated version of our mock-up system, resulting in a first version of an actual application intended to be used in practice. These design parameters set the focus of our next experiment. This application, based upon the first mock-up version should have the following characteristics:

- More focus on content and content supply
- More focus on consistency
- More focus on government agencies and their views on providing content
- More technical focus on filtering large amounts of content

The test system for experiment [I], stage [II], was again made in close collaboration with the Province of South Holland (with my eternal thanks to Peter Meijer and Frits van Gullick), where I gathered the information required by combining the information resources of a large number of municipalities, chambers of commerce, Ministry of Transport and other public agencies.

Content collection

During the whole design phase, a parallel period of content collection had been set in motion. In a sense the solution would be a simulation of reality with as much as realistic content put into the copy of the real world as possible. This should enable the ‘contextual browsing’ as suggested by the business managers in stage [I]. The content was hand-tagged with metadata and stored into a small database in a clearly defined file tree. The database contained several hundreds of megabytes of articles, legal documents, policy documents and news related to the municipalities in the region at stake. By combining the information resources of a large number of municipalities, chambers of commerce, Ministry of Transport and other public agencies we enabled assessment by the user of the legal service with a broader overview of the opportunities and restrictions in the region. In order to test the new functionalities we developed a prototype system that enabled business decision maker to access legal information in the spot with better socio economic constraints for his or her use case scenario. The content had to be related to the specific location and the covered area by the viewer. The consistency was achieved with something called ‘tagging’. The tagging of metadata was tedious and required considerable domain knowledge. Within the GIS community the relationship between Geo-location and content is known as “Geo-tagging”. The law and regulative documents are usually not geo-tagged and to achieve the relation which would enable geo retrieval, the content was tagged on the aspects “content category” and “municipality”. All municipalities were given a number.\(^{68}\)

\(^{68}\) Currently, the Dutch law insists on using the BAG, the base registry of addresses and buildings, but this was not available in 2004.
Types of users, experiment [I], stage [II]

I decided that the test group for this stage would shift from the business users (whose needs had been collected by this stage) towards the municipal and regional information providers. They were the “client” of the research question at this stage: They needed to know whether a map based interface could help to provide substantial case assessment support and what would be the conditions to actually design and fill such a legal platform with content.

The evaluation user group consisted of three sub groups and a standardisation expert group.

13 Municipality representatives (anonymised)

- M. V.  *Gedeputeerde (senator) – Province South Holland*
- L. B.  *Department of spatial development, living and economic growth – municipality of Katwijk*
- T. D.  *Berkel-Rodenrijs*
- J. H.  *Planning department – municipality of Dordrecht*
- E. v D.  *Partial planning – municipality of Nederlek*
- J.D.  *Chief planning – municipality of Zoetermeer*
- B. ?  *Planner – municipality of Dordrecht*
- H vd B.  *Specialist – municipality of Noordwijk*
- H. S.  *H. Szgedi*
- H. T.  *H. Tammerijn*
- M. S.  *M. Smits*
- P. B.  *P. Bode*

With these representative three expert sessions were held in The Hague, respectively on 13-11-2003, 28-01-2004 and 11-02- 2004.

6 Regional experts

- F. v G.  *Policy advisor Province of South Holland*
- N M.  *Head of department Spatial Planning*
- P. M.  *Policy enforcement spatial planning*
- T. O.  *Organization of Dutch regions, IPO*
- P Z.  *Organization of municipalities (VNG)*

These regional experts were member of the permanent regional focus group that assisted in the developments during the entire development phase.

12 regional representatives

- **Klaas Moedt**  *Province of Groningen*
- **Jan Jaap Dicke**  *Province of Friesland*
- **Liesbeth Jorritsma**  *Province of Drenthe*
- **Mark van der Sluis**  *Province of Overijssel*
- **Alex Licassen**  *Province of Flevoland*
These regional representatives participated in an expert session organized in collaboration with IPO held in Arnhem June 7th, 2004.

5 National standardization experts

- **Gerry Fenten**  
  Ministry of VROM, Ministry of spatial affairs
- **Yigall Schilp**  
  Ministry of VROM
- **Adrie van Bohemen**  
  Quarant spatial consultancy
- **Johan van Arragon**  
  Province of South Holland and National Geo coordinator
- **Wim de Haas**  
  Ministry of Transport, Geospatial expert (AGI)

These experts participated in the IMRO session held on February 10, 2005 at the Ministry of Spatial affairs.

In addition to numerous domain-experts interviews we demonstrated the map-based expert system to a test groups during four sessions. Together with the team of Provincial experts the system design was demonstrated, discussed and improved. Unfortunately the feedback on these demonstrations were not administrated with enough detail to include them in this thesis.

We also held a symposium on public content availability were we demonstrated and discussed the ADDWIJZER application. Participants of this conference were:

- **Asje van Dijk**  
  Senator Province of South Holland
- **Yvo Volman**  
  European Commission eContent Programme official
- **Marcel Haverkamp**  
  Member of Dutch parliament (CDA)
- **Prof Tom v Engers**  
  Professor legal knowledge management
- **John Kuipers**  
  eGovernment programme manager, Province of South Holland
- **M. Vissers**  
  Senator Province of South Holland

This symposium was held on September 9, 2004. The meetings were recorded in minutes by The Province of South Holland. (Peters & Wilson 2004, Arragon, IOG, 2005).
3.4.3. Technical issues with experiment [I] to be addressed in stage II

While the research question addressed in this thesis research is more functional than technical in character, some technical issues need to be addressed. As it is the case in all IT innovations, also here we had to find solutions for many technical issues. To give the reader an impression of our technical challenges I will briefly describe the technical aspects we came across. From the start of the first mock-up drawings, it was clear that the map-interface would require text retrieval and map information retrieval on the same interface. The map would enable navigation through the region or neighbourhood and the text-interface would help to select documents related to the selected area. At the time of the first design outlines there were no known GIS-applications that combined map-interface functionality with a text-interface functionality, except for a software programme called Flexiweb. Normal GIS or CAD\textsuperscript{69} applications would typically provide a map screen with navigational capabilities, like zooming and dragging, but text belonged to another world. The one exception called “Flexiweb” had recently been built by ISIS. The design expertise of Flexiweb is now used by the companies Crotec\textsuperscript{70} and Nieuwland. My first interface design was based on three main screens: map and map navigation, map layer activation panel and document retrieval.

Figure 18: first designs of experiment I, stage 2, produced by Mehera O’Brien, Framfab interaction designer.

The design had to facilitate navigation and retrieval for a set of use case scenarios as described by the business managers from stage [I] (LPG re-allocation, environmental &

\textsuperscript{69} Computer Aided Design, then often used for digital geographic layout of buildings and drawings

\textsuperscript{70} www.crotec.nl and www.nieuwland.nl
construction and recreation). While discussing the scenarios, it was decided to use a ‘tab system’ \textit{(`tab 1, tab 2, tab 3, etc. in the right bottom corner of the interface in figure 19') for the document retrieval, since we had to assume that different categories of documents were required to help business decision makers investigate the socio-economic context of a chosen location with favourable ‘legal attributes’. The ‘tab system’ was a new interface concept that, from 2010 and on, has become almost standard in sophisticated GIS interfaces.

Figure 19: additional contextual information for business manager case assessment: Retrieving data concerning a ‘dot’ on the map (ADDWIJZER project, EU e-content programme).

Besides the interface design, there are several other relevant aspects to the work done by my technical team at Lost Boys/Framfab. Describing these aspects does illustrate some of the functional dimensions as well:

\textit{\- spidering www.rechtspraak.nl and www.overheid.nl}

As described above, the application for the experiment would cater for both a text interface and a map layer interface. For the text interface to function, a large number of articles and references had to be obtained to provide the user with adequate material.
For this purpose, development team-member Schneiders (Schneiders, 2004) programmed a spider that ‘crawled’ through www.rechtspraak.nl and the SDU\(^{71}\) database of published law behind www.overheid.nl and stored the fetched legal source information into a MySQL database for our application. The idea was to have weekly spider runs filling the legal text database “behind the map” to keep it up to date. The Spider was used and helped to enter the legal content. The spider required maintenance as well, since changes in the database caused ‘broken links’ with no content retrieved.

- layering of mapping categories and map layers and zooming levels

The layered data structure of GIS enables the user to open thematic maps in relation to a certain area. When combined with traditional SQL queries on the textual databases the application provides a powerful navigation tool. The query retrieves the text relevant for that specific geographic area. The computer adds one additional feature that is not afforded by physical maps or text-based retrieval systems: fast in-and-out zooming. The user can choose a certain zoom level and, within the map boundaries, he or she can click on each spot on the map or each data object projected in the map. Both spot and object can act as anchor for content displayed in a sub-screen or a new browser screen (the ‘tab’ structure in the figures). The relevance of a document is always anchored to the geographical coordinate and so are objects like infrastructure, business, laws, maintenance schedules, ownership status, environmental interests, etc.

\(^{71}\) The former State print office: [http://www.sduuitgevers.nl/nl/content/corporate-geschiedenis-sdu-uitgevers](http://www.sduuitgevers.nl/nl/content/corporate-geschiedenis-sdu-uitgevers)
Figure 21: Experiment [I]: knowability proof of concept with LPG petrol station scenario solution, built by Asa Elfebrand, Franfam/Lostboys, designed by Rob Peters and Mehera oBrien.

Figure 22: adjacency (or jurisdiction) demonstrated: NO\textsubscript{2}/CO\textsubscript{2} area alongside a main road overlapping a living area: such overlaps require additional measures like sound screens and CO\textsubscript{2} screens.
3.4.4. Conclusions of Experiment [I] phase II

The results of the efforts were shared in four expert sessions with four different groups as described above. The system was used in hands-on ‘walk-throughs and all members were given access to the on-line system beforehand. Notes were taken during the sessions by the Province of South Holland officials and by the umbrella organisation IPO (Peters and van Engers, 2004, Peters and Lakerveld, 2004). The system (already entirely webbased in 2004!) can still be demonstrated upon request and will be made available online in 2016 to support this research). The motive of the governmental participants to participate in our experiment was their desire to create a service for citizens that would enable an easier use of zoning plans. This motivation was founded in anticipation of the development of their new role which would result from the shift in roles put upon them by the new Spatial Law in the Netherlands’ (NWRO72). One of the members of the group later became chairman of the National Gideon’s initiative, aimed at Open Geo services in a broad sense from regional authorities73 (Arragon, 2007). The discussions did provide tentative answers to a number of assumptions related to the design question of case assessment. The LPG specialist also noted the significant advantage of being able to access many kinds of information in a composite model of planning areas, built environment and applicable laws. He emphasised the complexity of gathering data on zoning plans, cultural heritage information and archaeology, soil, cables, piping, sanitation, etc. Normally an enquiry with municipal authorities can take a long time, and the instant results from a map based legal assessment system would have significant business benefits (Peters and Janssen, 2005).

While the results of our tests illustrate significant differences in the characteristics of the use between the user types, they also show business experts can adapt to law as well as law experts can adapt to business issues with the help of an appropriate interface backed up by legal content and contextual content. A key finding in our business user studies was the need to combine map layers to deal with legal instruments and other contextual data necessary for addressing business problems. The business manager required this contextual data for his case assessment. The planning of an LPG station implies legal knowledge as expected, but also data about current and future road traffic, for example. It was noted that the essential model of map layers had to be made expandable to allow inclusion of any data that could be meaningfully linked to the core concept of spatial representation in line with Polanyi’s definition of tacit knowledge (Polanyi, 1958). We found that the more contextual information we were able to provide for the user to browse, the more he was “triggered” to become actively involved and engage with possibilities shown by the system. It seemed that the affordances (visualisation, comparison, aggregation, overview) provided by the map invited to “nose around” and to look for alternatives. All users stated that they would support storing the experiences they found while doing a search into the system for other (future) users.

72 http://www.nwro.nl/?file=kop1.php
73 https://www.pleio.nl/pg/groups/10933/progideon/
The goal of experiment [I], stage [II] was to provide an almost real simulation of the legal and social economic environment, with as much contextual data as possible, offering as numerous free browsing possibilities with the purpose to find out if a map-based legal assessment system would be a) beneficial for business managers and b) feasible for government legal information providers (municipalities, regional authorities and national policymakers). The Province of South Holland expert team, the IPO expert group of regional authorities, and the National Ministry representatives all concluded, that the system should be advanced from experimental stage into production. This very strong support provided additional confirmation of the relevance of identified needs and suitability of the presented solution approach.

The map interface affords a number of advantages

The new interface developed for our application in experiment [I] stage [II] had a number of advantages compared to the paper-based information systems used in the participants’ daily practice. It provided them with:

- An overview on more than one municipality or area, affording parallel investigation of likelihood of permits instead of sequential requests for permission bridging legal geographies that consumed many months of time.
- Contextual information, affording more realistic case assessment and constraint analyses.
- Instant visualisation of permissions, providing the affordance of legal comparison.
- Inference engine used for “greying out” map layers was considered feasible.
- Increased legal drafting and amendment quality for the municipality (article 19, WRO 2014, Arragon, 2007).

All of these design features were received positively. A number of substantial decisions underlined the significance of the positive opinion about this proof of concept:

- The Province of South Holland decided to bring the system into production, this was planned after the reorganisation of the spatial planning legal process.

74 http://geozet.koop.overheid.nl/overuwbuurt/overheidnl/
75 http://www.geonovum.nl/dossiers/pdok
The standardisation authority (Ministry of Housing and environmental affairs, DURP programme) decided to integrate some of the semantic technologies to enable queries into their spatial planning law (more detail in chapter 5).

The European Group to promote the use of Public sector information was very positive about the opportunities the interface provided for ‘customers’, when it was demonstrated to 20 delegates of that group (European Commission, eContent programme 76).

These findings indicated an important step towards a better case assessment and a more user centred design of the legal services. Nevertheless, also a number of objections were raised by the users, the governmental experts and our own technical team. These provided opportunities to improve our initial application and allowed us to realize even greater improvements.

3.4.5. Critical reflections with Experiment [I], stage [2]

The feedback that we received in the many early Living Lab sessions that we have held were not recorded according to academic standards, although minutes were made that were useful to us when developing our system. The experiment was managed in an architectural, explorative design approach but the questions and discussions were not recorded in a structured way to allow sound analysis and consequently this left us with unsufficient evidence that maps provided a better access to law and support for case assessment, than the existing text-based systems used in practice. We also had some other findings:

1. The content in the databases was not maintainable at reasonable effort and costs, and manual maintenance was not acceptable due to inconsistencies, costs and dependencies. This resulted in strong doubts from the legislators and civil servants given the costs involved, so we had to find alternative solutions.

2. The relationship between ‘location’ and ‘legal’ was made only at indicative municipality level; by storing content in rough categories in the database the query resulted in regulations that were “location based”

3. The meta-tagging of content and some key words had to be done by hand; labelling some environmental news article was hard to fit in a taxonomy without human selection;

4. The action capabilities of Map interfaces over text based interfaces were appreciated by the users, but more empirical evidence is required to substantiate research claim and provide a method for repeatability of the experiment.

5. The IMRO standardisation effort was seen as an instrument for spatial planning and not as an instrument for eGovernment service engineering.

6. The potential and feasibility of retrieval of “what-can-I-do-here?” had been convincingly demonstrated. The retrieval of Text-to-Map was still unsupported:

The “Where-can-I-do-this” question was therefore still not answerable. This affordance would demonstrate a much more user-centred approach to case assessment with active alternative finding support helping the business manager). This requirement was expressed by the business managers as a legal ‘service’ they required.

3.4.6. Why is text-to-map so very different from map-to-text?

The point is to investigate a system from the viewpoint of the business manager who requires a service in the form of certain affordances and perceived action possibilities. The starting point of the business manager is the desire to create some business activity. In this sense it is a case-based approach. The hypothesis is, that the map can be helpful when the effect of a legal article is projected on a location: a smarter use of ‘jurisdiction’. (Boer and Peters 2007). The match between the nature of the desired business activity (lebenswelt) and the application-effect of legislation at the specific location, is seen as more effective, than by applying a database match retrieved from an abstract number of textual databases with legal sources. Text-to-map functionality enables a search where the user enters a keyword in a pull-down menu (see figure below) that is related to the desired activity and receives results of locations on a map where the relevant attributes occur in the real world or where the required legal constraints apply.

Figure 23: entering a key-word related to business activity.

This is similar to asking an expert for his advice of a relevant location and the expert points to a location on a map. Map-to-text functionality provides information about a specific location by clicking on a map at that location. Map-to-text functionality is much simpler and exists now on Google Earth, for example. Text-to-map functionality requires an enormous standardisation effort. Imagine trying to drive an oversized truck in the Netherlands from the point A to the point B. It is relatively easy to create a database-driven website that enables the functionality of ‘a mouse-over pop-up’ to provide the visitor with information regarding that
location. Many governmental websites and many private platforms offer such functionality these days; Google Earth is a good example of the development that started to appear in 2005. This method will be referred to as ‘Map-to-Text retrieval’. This method only requires the identification of those obstacles for the truck driver, that are related (geo-tagged) to the specific route chosen by clicking on the map between A and B. The reverse retrieval method, however, **is only possible when the entire domain has been digitally ‘charted’**. I have argued that the citizen-centred design implies telling the ‘user’, ‘what the potential opportunities in a region are in a given use case scenario. For identification of the possible routing without problems all alternatives of all Dutch road and all obstacles have to be standardised and entered in a database. It is relatively easy to fill a database with attributes like ‘maximum allowed height of cars and trucks’. For the reverse question: ‘give me all the locations that allow for more than 3.80 m’, a number of additional conditions would have to be met:

a. Data should be available for the entire (!) area of investigation  
b. A national standard should be set for the whole area with the same definition of ‘height’  
c. There should be a standard relationship available between ‘height’ and ‘location’  
d. The need for concurrent updates or maintainability becomes much more pressing  

This method of case assessment service and opportunity finding service will be referred to as ‘Text-to-Map retrieval’. It is part of the technology that affords knowability. I will explore this functionality further in Chapter [IV].

### 3.4.7. Maintainability and cross-referencing: implementing IMRO

The most interesting problem or challenge was the idea of a user entering text or attributes and, as a result, receiving locations. The implementation of IMRO by the Provincial authorities could be seen as a very promising development for designing maintainable legal services with the more user centred perspective. In order to answer the where-can-I-do-this-question with text-to-map retrieval, I would have to follow up in that direction. The last stage of Experiment [I], stage [II] was therefore to include the first Dutch IMRO-coded zoning plans, which were probably the first real legally powered digital maps in the world. I will describe the mechanics of IMRO in detail in subsequent chapters. As stated above, the combination of text and maps did create a powerful tool, but it had two major flaws: the lack of maintainability of the content (Wilson and Peters, 2004) and the lack of cross-references between ‘text’ and ‘location’. For the reason described above, we were particularly interested in the first experiments with the municipalities who wanted to implement IMRO. This unbreakable link between regulation and location that would cover the entire Dutch country could be the base for a much more maintainable system with built-in cross-referencing!
**Figure 24** shows the first Dutch IMRO coded zoning plan. It is a neighbourhood in the city of Dordrecht. The interface allows for clicking on each coloured area and generates the legal allowance in that area. In 2004, this was perfect *map-to-text* service delivery from the technical point of view.

**Figure 24**: Experiment [I] prototype interface - local level with first IMRO-standardized plan in The Netherlands in 2004, every individual color is a specific legal effect area or jurisdiction!

### 3.8. Conclusion and answers to the research question addressed in Experiment [I]

Parts of the design question has been answered at this stage. The chosen explorative method (discussion sessions) caused some methodological problems. I found some serious technical challenges for maintainability (costs) and accessibility from text-to-map (case assessment from a user centered perspective).

Conclusion to (research) design question I: We may conclude from the results of interviewing the users, experts and government experts that their feedback supports the Hypothesis I, that they are better served by a map-based approach over a text-based approach to identify alternative opportunities with their goals in their context (Knowability).
For the sake of reproducibility, the experiment about a preference of maps over text should however be conducted in a more structured manner. This would be covered in experiment II.

The next chapter will describe this Experiment [II]. In this experiment we addressed the questions raised by the explorative experiment [I] about new technical design solutions to maintainability and the text-to-map functionality. The system we designed and formed the basis for Experiment II would be based upon a technical design that creates knowability from a use-centered approach to legal effect planning from both the viewpoint of the government agency and the user.
IV:

Feasibility of a Legal Service Infrastructure (LSI)

- Problem of legitimation of legal system
- Theory: does technology help?
- Maps Experiment I
- Legal service infrastructure
- Formal map test Experiment II
- Theory on Co-regulation
- Technologies for Co-regulation
- Co-regulation Experiment III
- Conclusions
- Future research and recommendations
- Living Lab + Case study
Hoe verder de geweldige industrieel en technische ontwikkeling van stoommachine tot electriciteit voortschrijdt, hoe meer zij de illusie schept dat in haar de vooruitgang van de beschaving gelegen is. De overschatting van den economische factor in de maatschappij en in den menschelijken geest was in zekeren zin de natuurlijke vrucht van rationalisme en utilisme, die het mysterie gedood en den mensch van schuld en zonde vrij verklaard hadden.”

Johan Huizinga

Johan Huizinga, ‘Homo Ludens, Proeve eener bepaling van het spel-element in der cultuur’, 1938.\(^\text{77}\)

\(^{77}\) Translation: The more profound the industrial revolution from the steam engine towards electricity advances, the more it creates the illusion that this is an advancement of civilisation. The overestimation of the economic factor in society and in the mindset of its citizens was to a certain extent the natural fruit of rationalism and utilism, which both killed the mystery of life and at the same time freed Men from guilt and sin. Where the most famous Dutch historian Huizinga loathed electricity as the killer of all culture and value, he might have liked the digital revolution, since gaming has been it’s second most powerful driver and playing games was in his view the proof of the existence of the supralogic soul of humanity.
In Chapter [III], the research findings indicated a positive inclination towards our map-based technology solution; however, there were strong doubts about feasibility, maintenance efforts and costs that would have to be made when regulations or factual situations change. The accessibility was improved by increased usability, but the knowability required an increased service orientation from the side of government. The business manager for example required more help with opportunity finding, which would require additional services to be offered. In Experiment [I], three main issues have been found, namely:

1. The legal service of ‘opportunity finding’ was not supported by the first prototype in a satisfactory manner. The service of rendering all locations with a high probability of meeting the business manager’s needs required an elaborate interaction with the system, as the main mechanisms that were available in the first prototype were selection and drill down. Enabling enhanced opportunity finding was seen as an important part of the technology support for improved knowability. The map-based approach seemed promising.

2. The test group of government officers that would have to design and deliver the legal services to the business manager using the map-based technology had expressed doubts about consistent maintainability of the content in a consistent manner. There were also worries about the estimated costs involved with delivery and the maintainability of all the relevant legal and other content. The fear was based on the assumption that the maintenance and delivery of the legal content could not be fully automated. This legal service would require a service infrastructure with technical standardisation design features that could enable a maintainable relation between location, function and legal source. I would have to demonstrate that a service infrastructure solution would serve this purpose without huge maintenance and delivery costs and without losing legal consistency. The emerging IMRO standard appeared to provide the means for a maintainable service. This idea for a solution from text-to-map retrieval seemed promising and would have to be tested for feasibility.

3. The qualitative research method used to investigate the map-based technology to support case assessment and planning for business managers had been indicative and explorative, but it was not repeatable in the format of a controlled experiment. An experimental design would be needed to allow repeatability.

This research in Chapter [IV] concerns the first two issues with regard to the need for a legal service infrastructure (LSI). Given the doubts on the governmental production side of regulations, and from the legislators at the regional level, the design questions are in
fact feasibility questions. The officials recognised the problem (remember the Arnhem glue marks deduction process) and they knew it should be done, but they doubt that it can be done. To answer these feasibility questions about legal service infrastructures a theoretical side-step had to be made first. Since this research area was not so new in many other domains, apart from law, I considered it necessary to investigate existing research on infrastructures, architecture and interoperability first. These have been studied in the context of European eGovernment developments, a field that many practitioners and scientists have been working on. The third issue about the formalised quantitative experiment is addressed in Chapter [V].

4.1. Introduction

In the first two chapters, I have described the relationship between legitimacy and knowability of law. Chapter [III] provides a description of a technology that could support accessibility and knowability. The explorative results of the experiment also provided new insights about the needs from both sides of the ‘service fence’. The business manager requirements highlight a need for a different approach towards the concept of ‘digital services’. He wants help and this help should actively support him with opportunity finding or even solution finding. His requirement can be phrased as: ‘Please give me all locations where I might get a permit for building my new LPG station”

As observed by the government officers, the government service delivery side, requires maintenance, flexibility, consistency and overall cost efficiency. This service delivery needs derive from a range of aspects that can be attributed to the broad set of legal sources which have to be made available when legal effect planning is the goal. Those aspects are pluriformity of sources, integral policy making in relation to the legal source and legal effect expression. The challenge of the government officers about legal effect planning can be defined as: [...] “We have many regulations affecting one location. How do you propose to organise all (digital) legal information regarding that location so that the resulting purpose on the map - as seen by the citizen - reflects what we intend it to reflect?”. ‘To us this looks hard to maintain and very expensive.” [...]”

In this thesis I will not address cost calculations, as this research is exploring the potential role of technology to foster legitimacy. I will have to demonstrate the feasibility of a maintainable service in a plausible manner. This plausibility will be argued and demonstrated by means of a new prototype, which will be discussed with the relevant government officers. The legitimacy theme, translated earlier into a usability problem, now migrates towards a feasibility problem. The problem is to design and build a legal planning service infrastructure. Chapter [IV] will describe an investigation in the aspects and issues of a service architecture. I will explore some of the theoretical concepts that are part of the research body on eGovernment service infrastructures.
Exploring eGovernment research on consistent and maintainable legal service infrastructures: gaps and challenges

The relevance of a legal service infrastructure requires explanation. In Chapter [II], it has been argued that transparency of law and multi-sector applicability of services are necessary requirements. The need for integrated process design from legal creation to enforcement and policy adjustment was also mentioned. The challenge for me was to find the technology that would support these requirements and would enable the alignment of these legal processes across different government layers, government sectors and actors. The latter is called legal pluralism (Griffiths, 1986, Merry 1988). Griffith defines legal pluralism as: ‘The presence in a social field of more than one legal order’.

Next to the problem of dealing with legal pluralisms, different services are provided by different stakeholder in the legal production chain:

- those in the initial production chain (legislative drafting);
- those who present the legal information on websites like www.overheid.nl, Regional or provincial websites and city websites;
- the planning and design agencies, including the planning consultancy firms;
- the enforcement agencies.

The activities of these stakeholder should clearly be aligned. Some stakeholders in the production chain have to deal with overlapping jurisdictions.

The customer or business manager seeking answers about permissions and prohibitions (lebenswelt) should be supported by the technology at the client side, but the same technology (architecture, exchange formats, standards, structure of documents, etc.) should support maintainability and legal consistency across those sectors and the levels on the governmental side. All these players require consistency, concurrency and legal coherence from the perspective of the policy intentions (what do we want to achieve) and enforcement (how to make sure that there is compliance). The scientific arena of information theory and government processes has been called ‘eGovernment’. Could this body of research help us with the design of infrastructures for legal service delivery?

As stated in Chapter [I], the first Dutch attempt to become more user-oriented in the face of pluriformity was launched by the ‘loket 2000’ programme (Poelmans, 2001). This followed the European Commission Life-event orientation for citizens, where not the government process, but the citizen life cycle became pivotal to the design of services. The European Commission increased their efforts for a more user centred focus in later years:

The Commission is preparing the eCommission 2011-2015 initiative. Its overarching objective is to evolve from today’s Integrated Commission to tomorrow’s Transformed Commission. This implies that public services:
will be built from the viewpoint of external and internal users and no longer be based on an organisation’s structure;

- will completely automate end-to-end processes crossing organisational boundaries;

- will share information in transparency among services and allow groups to collaborate and share knowledge and expertise.

(Brussels, 16.12.2010, COM(2010), 744 final.)

The Malmö eGovernment action plan as agreed on in 2009, had defined 4 metrics for eGovernment services:

- Empowerment of citizens and businesses;
- Strengthening mobility by means of integrated services;
- Increasing efficiency and effectiveness;
- Enabling border crossing services.

Bekkers, van Duivenboden and Hoogwout have described a tension between government services concerning the political decision making process and the services related to the delivery of commodities. Both warn for the “legitimacy paradox” when eGovernment services are too easily based on efficiency and the rationality of New Public Management ideas, disregarding thus the dimension of political prioritisation. (Bekkers 2001, van Duivenboden, 2005). They claim that government is first and foremost the collective decision-making apparatus with an accountable, independent, impartial authority. It is not a very efficient service organiser, as a consequence of many requirements related to the need to stay accountable, impartial and independent. According to those researchers, the notion of efficient ‘service delivery’ by government and the political dimension of ‘legitimation’ of that service should be kept together. Focusing too much on the efficiency side (and on reducing costs) of services, undermines the legitimacy of government’s collective role. The public type of service cannot be compared with the commercial notion of efficiency and costs (Hoogwout, 2010). Van Duivenboden argues that the efficiency paradigm can be a danger to the participative paradigm and places participation and legitimacy almost opposite efficient service delivery.

One may have to be even more careful when designing services or co-creating services in the legal domain. The term services as in ‘participative services’, appears to be different from the services associated with the delivery of ‘service commodities’, such as the provision of passports and the building of roads. The message is, that if government is seen by the public as a rather inefficient legal service utility, that perspective may undermine the position of that same government as the legislator and impartial enabler of the prioritization process. Some of this debate can be found in the debate in the Netherlands about the recent plans for the new contingency law (omgevingswet78). In 2010, the Dutch Ministry of housing launched a programme to provide integral government services for permit

78  http://www.rijksoverheid.nl/onderwerpen/ruimtelijke-ordening-en-bereikbaarheid/vernieuwing-omgevingsrecht
provision that took the pluriformity (and, thus, the wide range of city help-desks involved to process the service) very serious. The goal was to deliver one ‘contingency permit’ for all building permission procedures in the country. The ‘omgevingsvergunning’ encompassed the building permit, the environmental permit, the land use permit, the construction permit, the demolition permit and the tree rooting permit. This action plan illustrates the beginning of a government that is aware of its own inadequacy in service delivery and that seeks to improve the service levels to citizens. Van den Broek, a legal councillor for the national workers union (FNV) states: ‘[...] “the law on environmental, spatial planning, water and Nature has become so complex, that even specialist cannot maintain the required overview of developments. This gives too much uncertainty to business managers. The government avoids all risks by insisting on numerous investigations. One contingency law will simplify matters for businesses.’ [...] (Van den Broek, 2012)’. He is countered by Biezeveld in the same article: ‘[...] “I advise against the contingency law. That law would combine dozens of regulations on water management, environmental management, ecology and spatial planning”. “The efficiency gain is overestimated. But even worse is that the consequences of decennia of careful legislation effort carried out by the labour of many stakeholders are being turned upside down without think of the risks and consequences’. One has to avoid symptom fighting and gross simplification of complex matters.” [...] (Biezeveld 2012). While the contingency law is sold by its supporters as a more efficient service for both businesses and legislators, others warn for the loss in nuance, in knowledge about spatial planning and in smart use of scarce space in general. They claim that the ‘old’ spatial planning law was a necessary instrument for careful balancing of different interests. In short, critics warn for a loss of legitimacy with regard to the other roles of government. I will elaborate on this subject in Chapter [XI]. The Dutch government process re-design of the ‘omgevingsvergunning’ is still in progress. The ‘omgevingsvergunning’ requires consistency, concurrency and many aspects that I will discuss later. The concept has been heavily criticised by researchers (Hoogwout, 2009) for its complexity, its feasibility, challenging its claim of improved user service. These requirements of consistency and concurrency all justify the need for an infrastructure as integrative technological instrument.

“IN HAAR BRIEF AAN DE TWEEDE KAMER SCHRIFT MINISTER SCHULTZ VAN HAEGEN (Infra-structuur en Milieu) DAT HET OMEGVINGSRECHT FUNDAMENTEEL OP DE SCHOP GAAT. “Het omgevingsrecht moet vereenvoudigd, versoberd, gemoderniseerd en uiteindelijk gebundeld worden in één nieuwe Omgevingswet.”

TRANSALTES AS: “The Letter to Parliament of the Minister states that the Minister of environmental law and infrastructure will reshuffle the whole of legal context for building and environment fundamentally in order to make it become more simple, more sober and modernized. (from “kennisbank omgevingsrecht” the juridical knowledge source on building and environment, 2011)"
Another aspect of service design is related to the challenge of change. The real world in which cities and business manager operate keeps changing. Jurisdiction changes, authorities change and Ministries have a tendency to move about with legal mandates. To once more use the analogy of the water supply infrastructure from Chapter [II]: the aqueduct looks impressive and solid, but it quickly becomes obsolete when the rain or snow water supply from the mountain takes another course! Maintaining consistency in a changing world requires flexibility and consistency over time. This consistency does not happen by itself. It has to be facilitated and managed by the technology and many agreements on architecture and standardisation. The need for standardisation increased when governments became aware that interoperability issues limited the connection of services that are required for realizing the eGovernment aims.

The feedback from the governmental agencies and national standardisation authorities during Experiment [I] showed that procedures to retrieve and store legal information should not be different for different domain areas or sectors: juridical information for spatial planning, for traffic policies, for housing, for environmental policies, for business development and so on at more government levels should be updated and accessible in one standardised way. Only in this manner the alignment that was mentioned earlier would become possible. It was again in the geographic area that the need for common information models leading to one information infrastructure architecture became pressing.

In 2004, Marcel Reuvers (www.geonovum.nl, part of the knowledge network of the Dutch Cadastre and the Ministry of Spatial Affairs) gave a presentation on multi-sector Geo architectures, that later became part of the conceptual framework for the entire European Environmental enforcement policy: INSPIRE. IMRO (spatial planning), IMKICH (cultural heritage) and IMWA (water management) were later to be extended to many other domains, like safety, real estate design, piping, energy, etc. The geo information infrastructure became the main object of a research group called SDI (Spatial Data Infrastructure, or Spatial Data Information Infrastructures, (see Bregt, 2004, 2005, van Oosterom 2009, Bezemer en van Oostrom, 2008). It is elaborately defined by Groot and McLaughin as; ‘a set of institutional, technical and economical arrangements, to enhance the availability (access and use) for correct, up-to-date, fit-for-purpose, and integrated geo-information, timely and at an affordable price, with goals to support decision making processes related to countries sustainable development’(Groot and McLaughin (2000), quoted in van Loenen, Besemer & Zevenbergen, 2009, p.11). The whole resulted in the NEN 3610 geo-information model (2005). In 2013 the overall modelling was accepted by parliament and implemented in PDOK under the name IMGEO2.0. This notion of an SDI, a spatial data infrastructure

http://portal.kennisbankomgevingsrecht.nu

http://inspire.jrc.ec.europa.eu/


BGT-info 2012
would become relevant for my experiments, since these developments gave substance to the idea of maintainability, interoperability and service continuity. What we would investigate, could become part of a greater whole – if successful – rather than a stand-alone proof of principle. This notion of a Spatial Data Infrastructure (SDI) is the foundation for a Legal Service Infrastructure (LSI).

Figure 1: Developing models of geo standardization (P. Janssen, 2013).

The notion of a pluriform, country-wide information infrastructure did not always exist. The implementation of the basic registries or key registries and the implementation of country-wide architectures like NORA in the Netherlands, SAGA in Germany and IDABC at the European level, had not reached the mind set of all government actors involved (see table below). One may argue that it is difficult to validate a theory against the opinion of stakeholders that do not know the existence or the service possibilities, so interviews would not work in this case. Few people could imagine the action possibilities of such an infrastructure: it is like asking people at the village square water pump to visualise the hot water tap in the bathroom of the future (see the analogy in Chapter [II]). It is beyond the horizon of their activities. For this dimension we chose to validate against the opinions and experience of the front runner (in 2008) of all Dutch regional authorities: the Province of Flevoland. This regional authority had embraced most of the concepts of National standardisation and the notion of architecture had been accepted at the highest political level. At that time we did not know how significant a common architecture design to provide legal services would become. In retrospect, to extrapolate that infrastructure paradigm to other sectors, such as the juridical domain, does not seem to be such a great step now.
Design solutions for maintainability and consistency: 

requirements

As described in chapter [II], the issue of maintainability and consistency of (legal) content delivery had to be approached with technical design principles for proper architecture, like standardisation, loose coupling and layering as well as web-service infrastructure. I have also stated there that ‘efficiency’ and ‘effectiveness’ and ‘client centeredness’ were all agreed design features (European Commission 2010, Hirsch Balin, Dutch Ministries, 1999 and Venrooy 2002) to measure eGovernment services and service chains. There are some concerns about the use of the term ‘effectivity’. Effectivity of government services can be seen as the effect of policies on behaviour of citizens, and this perception is beyond the scope of this research. I did not investigate the behaviour of people given certain policy intentions. Effectivity can also be defined as the extent to which the public administration implements the policies of political decisions in an effective service delivery manner. The citizen or business manager is informed in an effective way about the intentions of government and he knows what his options are. This is a form of alignment between policies and services. I will use the term effectivity in this fashion. To summarize the requirements for the legal service infrastructure as accumulated they are listed again below.

1. Efficiency  
   cost-effective, low maintenance  
2. Effectivity  
   aligned with policies in cycle  
3. Multi sector  
   able to deal with different policy areas  
4. Consistency  
   able to deal with pluriform legal environment  
5. User centeredness  
   able to provide service from user perspective  
6. Usability  
   ease of use  
7. Flexibility  
   able to cope with changes over time  
8. Transparency  
   accountability

I will elaborate on these requirements later in this chapter.

4.2. Research on eGovernment infrastructures and legal interoperability

Before I continue the search for legal eGovernment services, I have to investigate what role law has played in the design of those services until now. It appears that this role is often limited to a design constraint at best, or an unquestionable constant in the design equation at worse.
A well-known and rather normative benchmarking model of better eGovernment services has been used by Cap Gemini (Cap Gemini, 2006, page 1783) to produce the European benchmark on eGovernment. It was and is normative in its impact: governments tend to follow what is shown by the Benchmark because it is endorsed by the European Commission. Cap Gemini explains a ‘holistic model’ to justify the aspects of eGovernment services that countries in Europe should have in readiness. In the figure below it can be observed that the legal factor does not play a role in this model. Again, the law is seen as background structure or at least as a given. This ‘holistic’ benchmark authorised by the European Commission is measuring the state of the art of eGovernment services in 25 countries for many years, but it does not address the connection between a government service and the legal source it has been derived from. This is unfortunate because the benchmark as it is now will not help governments to discover their weaknesses in improving transparency, effective legal services and consequently improving the legitimacy of their efforts.

Figure 2: European Commission eGovernment Benchmark, (Cap Gemini 2003).
Both Van Engers (2003) and Venrooy (Venrooy 2002, p 18) argued that government services must comply with the principles of correct administration: [...] “Het handelen van de overheid is gebonden aan de regels van het recht. Op deze manier wordt willekeur tegengegaan (rechtmatigheid). Dit draagt bij aan de legitimiteit van het overheidshandelen (WRR, 2002, p. 11). All government action should be based on law. In this manner arbitrary ruling is avoided. This contributes to legitimacy of government actions.” [...] (National Legal Council, 2002). In their article about system level bureaucrats, Bovens and Zouridis provide the same reference listing for correct administration.

[...] “The process of decision-making, for instance, has been strongly circumscribed by the principle of careful preparation, the fair-play principle and the prohibition on détournement de procédure. Furthermore, a number of principles refer to the justification and structure of decisions, such as the limited means justification principle and the formal legal certainty principle. Finally, there are principles that impose standards on the quality of the content of decisions, such as the principle of proportionality, the principle of legal certainty, the principle of legitimate expectations, the principle of equality and the prohibition on détournement de pouvoir. It was the development in particular of these procedural and material principles of sound administration, as they are called in The Netherlands, that brought the welfare state explicitly within the bounds of the rule of law and that, at least for now, has kept the fulfillment of Hayek’s prophecy of doom at bay.” [...] (Bovens & Zouridis, 2010). Venrooy and Zuurmond both argue that the legal base should be flexible enough to provide better service delivery. For example, the paper signature for authentication might not be part of a service process by law, but the legal base is still regarded as a given formal ‘cause’ for the need for service delivery. This line of thought is one of the main drivers for governmental effort towards legal reform in 2014: The Dutch Minister Kamp of economic affairs, campaigning about laws being a hindrance for innovation regarding taxi’s, café’s, Sunday openings, price of books, truck driving times and 3D-printing (Volkskrant, October 2014). A member of parliament supports this campaign by stating that this allows for “laws and regulations being adapted to the technological possibilities and societal change of the twenty-first century”. Their arguments address another layer of services and define law as a constraint.

4.2.1. Integrated design approach of services in relation to their legal source

Van Engers creates a strong link between the design of the legislative infrastructure and the design of the service delivery (van Engers 2003, p. 13).

This distinction is relevant because the legal system becomes a part of the equation (and thus, the integrated design process) rather than remaining a given formal background for the “service” of government. The law is not a given that has to be translated into a website. In this definition, the service is part of an integrated policy steering mechanism and the design of all parts is relevant to reach the objectives of the policy. From a user-centred perspective, in this integrated approach, the service should be seen as help to design better
access and better understanding of legislation and the policy. In the world of the ‘service’ of delivering justice a successful attempt to create integrated design is mentioned by Roberts.

Figure 3: the relation between processes and systems, and the legislation that creates the basis for those processes and systems(van Engers, 2003, 2005).

The integrated design is taking into account the legal source and the whole service delivery chain. The standard is then called Global justice XML\textsuperscript{84} and it is an offspring of the 9/11 event (Roberts 2003, p.132). The application area of this initiative is specifically limited to the delivery of justice service chain. This is also true for the European equivalent called e-Justice. Its approach does not appear to have spread towards a more integrated design of law and legal services. Another reason to apply a design oriented approach toward service delivery and law as an integrated whole is that the instrument for delivery is information technology in the broad sense. Most digital eGovernment service practices in the 90s ignored the policy intentions of regulations altogether and took the Law as a starting point for implementation. Some recent practices regard the law as fixed and the delivery process or the enforcement process as variable. Others regard the delivery process as fixed and the ICT as variable. It appears that the world of digitalisation and process design neatly follows

\textsuperscript{84} http://it.ojp.gov/jxdm/
Sternbergs’s distinction of ‘legislative’, ‘executive’ and ‘judicial’ legal knowledge users\(^85\) (Sternberg 1997). Van Engers and de Boer (2010) developed the model including the entire cycle as described above into the one as described in Chapter [II] (see figure below):

Figure 4: Three layers of legislation development, implementation design and case handling operations seen as a cyclic policy making process, (van Engers and Boer, 2010).

Both models of van Engers and de Boer indicate a certain tension for the service delivery side of government. The client side (our business manager) demands push for a user friendly, effective and efficient service. The socio-political policy making demand push for more legal steering of society which results in more rules, regulations and legal sources from the National Ministries. The administrative implementation seems to carry the burden of service integration, flexibility and consistency to make it all work.

\(^85\) In my experience as eGovernment project manager this notion of truncated service design became evident since technical designers seldom question the intentions of the principal; they just build it according to specifications.
4.2.2. Architecture and interoperability

Having established the requirements for a service infrastructure, I can now examine some of the design principles of such an artifact. The design of an infrastructure is based, like a tapestry, on a design pattern. Such a design pattern is based on thoughts and concepts about consistency, flexibility and coherence. Those concepts about ICT-infrastructures are described in studies about architecture. Within the literature about digital government infrastructures, such concepts have also been studied especially in the area of interoperability. I will explore some of those concepts about infrastructure and architecture.

Since this thesis is a design theoretical view on law and we have defined design in the context of eGovernment services we can extrapolate to the design of a “legal service infrastructure”. But, what is an infrastructure and what is architecture?

- In the Oxford Dictionary, an infrastructure is defined as: the basic physical and organizational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise.

- The Latin root of infrastructure is the combination of infra: ‘below’ and structura from the word ‘structus’ which is the past for ‘struere’ meaning to ‘heap up’ or to build.

- Recent efforts to devise more generic definitions of infrastructure have typically referred to the network aspects of most of the structures and to the accumulated value of investments in the networks as assets. One such effort defines infrastructure as the network of assets “where the system as a whole is intended to be maintained indefinitely at a specified standard of service by the continuing replacement and refurbishment of its components (Association Report, 1998)

- Architecture: the complex or carefully designed structure of something: the conceptual structure and logical organization of something.

- In information technology, the term architecture used to be limited to the design of the technical Network infrastructure of hardware (ITIL, OGC, 2001). Later it was broadened towards service in the technical meaning, which is a message or software functionality sending and receiving infrastructure architecture based on standardization (see http://www.w3.org/TR/soap/ and http://www.w3.org/TR/ws-arch/)

- Infrastructure is a ‘basic provision for public use, something of which the public expects it will always be there, and like with the traffic infrastructure, something the public expect to work properly or it will generate irritation’ (Truijens et al.1990)

In the paragraphs above, the challenges of a legal service infrastructure, such as maintaining overall logic, capability to handle diversity and pluriformity, availability, pri-
cencing have been mentioned. A number of developments in spatial data infrastructures have been described earlier. These efforts aim at service delivery through ‘interoperability’. Interoperability is a common theme in many government service infrastructures in Europe. It could be argued as potentially useful to apply the eGovernment service infrastructure theories about interoperability on the specifics for a legal service infrastructure. There are some problems with the theory on juridical service infrastructures, however. The term is used for an altogether different perspective already, which does confuse the matter. Luis Guijarro gives an overview on interoperability standards depicted below, but does not mention any Legal interoperability standards in his framework survey (ref).

Figure 5: Table of eGovernment interoperability frameworks: (Luis Guijaro, 2007).

<table>
<thead>
<tr>
<th>Interoperability framework</th>
<th>Agency</th>
<th>Country</th>
<th>Last version</th>
<th>Release date</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-GIF</td>
<td>eGU</td>
<td>UK</td>
<td>6.1</td>
<td>March 2005</td>
</tr>
<tr>
<td>CCI</td>
<td>ADAE</td>
<td>France</td>
<td>2.1</td>
<td>September 2003</td>
</tr>
<tr>
<td>SAGA</td>
<td>KDSt</td>
<td>Germany</td>
<td>2.0</td>
<td>December 2003</td>
</tr>
<tr>
<td>DIF</td>
<td>ITST</td>
<td>Denmark</td>
<td>1.2.10</td>
<td>December 2005</td>
</tr>
<tr>
<td>IDABC AG</td>
<td>IDABC</td>
<td>EU</td>
<td>7.1</td>
<td>September 2004</td>
</tr>
<tr>
<td>EAG</td>
<td>CIOC</td>
<td>USA</td>
<td>2.0</td>
<td>July 2002</td>
</tr>
</tbody>
</table>

SAGA is seen by many researchers as one of the first eGovernment interoperability standard initiatives in Europe: it stands for: “Standards und Architekturen für E-Government-Anwendungen” (SAGA). It’s initial focus was towards document exchange at first. Later, it became the framework for many more types of interoperability, like service interoperability. We can see many follow-ups in the table from by Guijarro (see figure 6). eGIF is the UK interoperability framework, for example. The Dutch version of an interoperability framework is called NORA. An interesting and elaborate study on interoperability efforts is published by the Dutch Forum on Standardisation in 2011.

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86 [http://www.e-overheid.nl/onderwerpen/e-overheid/architectuur](http://www.e-overheid.nl/onderwerpen/e-overheid/architectuur)
It contains the timeline in the graph *(see figure below)*, which provides a useful perspective on the importance of interoperability as a means for further integration of Europe. (Forum, 2011).

**Figure 6: Timeline (Forum standaardisatie, 2011).**

Many European eGovernment architects tried to incorporate ‘legal interoperability’ into the European interoperability frameworks. The problem is that they only refer to ‘legal’ as the condition for ‘data exchange’: […] “Legal interoperability involves the appropriate synchronization of the legislation in the cooperating Member State so that electronic data originating in any given MS is accorded the proper legal weight and recognition wherever it needs to be used in other MS. Legal Interoperability is necessary for a variety of reasons, including:

– To provide for mutual recognition of electronic data originating in other EU MS
– To enable a MSA to perform mutual assistance aspects of integrated/cross-border business processes, e.g., supplying national data of various types to other EU MS. As EU legislation generally is driven by the goals decided at the highest political levels, legal interoperability is closely related to, yet distinct from the political context, due to its much more technical nature.” […] (EIF, 2008, p. 33).

The eGIF (UK Framework) does address legal document management. This framework contains coverage of legal aid and advice, crime, law, justice and rights, animal
rights and welfare, civil and human rights, emergencies, ethical issues, extradition, firearms, justice system, law, security as legal source documents. However, the legal norms themselves and their consistency in a pluriform setting are not seen as an interoperability issue. Another example of “judicial interoperability” that addresses the interoperability as legal effect on information exchange or on technical interoperability of systems and specifically not as a design problem in itself is given by Goldkuhl: [...] “Judicial interoperability is defined as congruence between different laws/regulations. This means that it is necessary that legal preconditions for the IS interoperation are congruent.” [...] (Goldkuhl, 2013). Harlan J. Onsrud is one of many Spatial data investigators that define only the legal conditions for data-availability, so we lack this recognition of legal pluriformity and its need for technological supported consistency also in the geographic domain.

4.2.3. Towards a flexible Juridical service infrastructure

Given the considerations above, we may conclude that the European commission and many eGovernment research efforts acknowledge the question of service infrastructures and interoperability frameworks, however, they do not recognize the technical problem of juridical interoperability itself as an architecture problem (Peters and van Engers, 2007). I will now seek those areas of research that concentrate on Architecture as an instrument to design legal services. Breuker and Valente use the term architecture for the purpose of legal information modeling (Valente and Breuker, 1995). Valente proposes an architecture to address problems of legal assessment, legal planning and legal assignment of responsibilities in the context of a “social agent reasoning about legislation”. He calls this the “external perspective”. (Valente 1995, p. 138). His external perspective appears to be the same as ours: The notion of a user as client of legislation who tries to support his decision making process. This is what I would call a legal information serving perspective (Breuker1992, Winkels, Valente 1999, p.157). I used the term interoperability architecture and integrated services to argue a case for service delivery from a business perspective after reviewing eGovernment performance benchmarking in Europe. (Peters, Janssen and van Engers, 2004, p. 486) We discovered then that most performance measuring of governments failed to address services delivered by more than one government agency or website. Valente and other researchers do acknowledge the fact that architecture and design are necessary requirements for legal service delivery. The aforementioned LEGIS programme aimed at improvement of the legislative production process did introduce architecture, infrastructure and legislation in an integral approach. The LEGIS programme explicitly mentions the application of ICT technologies as a means to increase the transparency and the co-regulation

[...] Toepassing van moderne technologieën – met name open standaarden voor gegevens en processen – in wetgeving en wetgevingsproces bieden de mogelijkheid om beleid, wetgeving en uitvoering ook in technische zin met elkaar te verbinden en de nodige participatie en transparantie in proces en product te bewerkstellen.” [...] Translates as: [...] The application of modern Technologies – especially those like open standards for the exchange of data and processes – in law and legal policy making offer the opportunity to on the one hand integrate and align policies, law
and implementation also in the technical sense and on the other hand to include participation in the process and in the product development.” [...] (LEGIS programme, 2012).

The implementation of the Dutch omgevingsplan and the omgevingsvergunning described earlier has sparked a lively discussion about the requirements of such a service as I will describe in chapter [IX]. The need to maintain legal services in a cross-border situation sparked a range of programmes at the European research project level in the early 2010’s. The eJustice\textsuperscript{88} action plan (2008), eJustice ‘large scale pilots’ and the eCodex project\textsuperscript{89} are examples of interoperability infrastructures that are now emerging.

4.3. Design questions regarding feasibility

The design question for us is to investigate the feasibility of the service infrastructure design that would support the legal service based on the six previously established requirements. Those were: effectivity, (cost-) efficiency, multi-sector integration, consistency, text-to-map and maintainability. We will test the feasibility of the design in two steps:

1. **Can a legal service infrastructure (LSI) be built by combining available instruments?:** Test by explaining the different requirements and its translation into accepted architecture principles and solutions;

   *This design question, step 1 is answered positively when it can be made sufficiently plausible that a service infrastructure with the listed requirements can be built when it is based on generally accepted ICT architecture principles and solutions;*

2. **Can it be built in practice?:** Test by building a proof of concept;

   *This design question step 2 is answered positively when we can actually build a working proof of concept based on the architecture principles as indicated above;*

\textsuperscript{88} https://e-justice.europa.eu/home.do?plang=en&action=home

\textsuperscript{89} http://www.e-codex.eu
4.3.1. Infrastructure feasibility test, step 1

We have to test the feasibility of the legal service infrastructure using maps if it is based on requirements and general architecture principles like standardisation. We had indications that standardisation based on IMRO would solve both (in theory) the legal infrastructure problem and the text-to-map problem. You will find a listing for all seven requirements in the table below, followed by the theoretical approach for designing the solution.

Figure 7: Legal service design requirements and architecture principles.

<table>
<thead>
<tr>
<th>feature</th>
<th>Legal Service infrastructure Requirement</th>
<th>Consequence map based infrastructure</th>
<th>Architecture principle &amp; solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Policy effect consistency between rule and implementation apparatus</td>
<td>Consistency between intended policies and legal information on locations on map</td>
<td>Semantics and Relevance of content in OWL/RDF semantic reasoning</td>
</tr>
<tr>
<td>2.</td>
<td>Efficiency</td>
<td>Cost efficiency in legal content management, production and maintenance</td>
<td>Legal service Infrastructure where content is maintained by source owners themselves</td>
</tr>
<tr>
<td>3.</td>
<td>Integrated multi sector process</td>
<td>Standardisation in production chain</td>
<td>Metalex legal XML standard, LKIF interchange format</td>
</tr>
<tr>
<td>4.</td>
<td>Legal Consistency in pluriform environment</td>
<td>Interoperability and infrastructure approach</td>
<td>SOA Webservice based approach enabling concurrent updates of entire infrastructure, LKIF*</td>
</tr>
<tr>
<td>5.</td>
<td>User centred</td>
<td>User-centred service design based on Text-to-map affordance Location link to legal permission</td>
<td>IMRO standard, object oriented information management</td>
</tr>
<tr>
<td>6.</td>
<td>Maintainability and flexibility over time, adaptive to change</td>
<td>Separation of policy variables, norms and legislation</td>
<td>Infrastructure with separated OSI layers maintaining consistency</td>
</tr>
<tr>
<td>7.</td>
<td>Accountability</td>
<td>Transparency</td>
<td>Explicit business rules and models</td>
</tr>
<tr>
<td>8.</td>
<td>Usability</td>
<td>Not architecture</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

* [http://www.estrellaproject.org/?page_id=5](http://www.estrellaproject.org/?page_id=5)
This listing fits the intended purpose for map based legal case assessment of business managers. It is not conclusive, and I will elaborate on each requirement in the text thereafter, however, I will first elaborate on each service design requirement to explain how and why it applies to our proof of concept.

**Ad 1. Policy effect consistency:**

The technical interpretation of “effectivity” is related to the question of whether the policy intentions that are reflected in the legal norms are correctly translated technically into the implementation models, keywords and relevant information for the end user from the perspective of the policy maker. The technical translation during implementation is not without choices and simplifications, especially if human decision making is being replaced by a website.

Van Engers states that the lack of cross institutional cooperation leads to inefficiency and ineffectiveness that in turn will lead to a temptation for many citizens and businesses to improperly use or even violate the law due to inadequate governmental services and lack of transparency. The authors emphasize on the knowledge about eGovernment processes and systems and knowledge about the legal knowledge that is used in those processes and systems (van Engers and Boer, 2005.)

Bench Capon and Sartor (T. Bench Capon and G. Sartor, 2000), coming from a case law tradition, in which explicit rules that describe norms play a lesser role in some domains while preceeding cases determine the outcomes of case assessment processes, focus on the “purpose and the values” of law when modelling and formalising case based reasoning. Specifically, they state that:

> [...] We believe these things to be effectively the same: the purpose of a law is typically to advance or promote some desired value, and the audience is the community subject to the law. Thus our first goal is to provide a model of case based reasoning in which we can use purposes and values to explain disagreements and their resolution.” [...] (T. Bench Capon and G. Sartor, 2000).

Technically, ‘effectivity’ can be obtained by maintaining semantic coherence and consistency between policy intention, legal formulation and retrieval keyword or any other retrieval method. Bench Capon describes the term ‘traceability’ where any representation of legal text should be traceable to its legal source (Bench-Capon and Coenen, 1991 in Hoekstra, 2009, p. 123). The business manager with a certain land-use in mind retrieves a legal constraint or limitation for his actions by applying a keyword or a map-attribute. The legal constraint is meaningful in the context of the intended land–use. The legal constraint is also in alignment with the policies regarding the desired limitations (inhibitions and prohibitions) for that particular area of investigation.

Suppose for example that a business manager has the intended land-use: ‘establishing a new restaurant’, and seeks relevant permit information regarding restaurants. In the Netherlands HORECA is the acronym for hotels, recreation and cafes. The term is used to indicate all types of food & drink suppliers and can be used to point at all area where the land use is Horeca. The keyword ‘HORECA’ is the factor that contains the knowledge
for that type of land use and as a link to the relevant regulations with relevant business intentions in the entire country. If we would create similar keywords for other forms of land-use, we could create a mechanism linking information needs with relevant regulations. Semantic technology is the technology that enables the consistent manipulation of keywords in software.

Solution 1.

We plan to test the application of OWL semantic technology on the IMRO-coding of land use. The question is whether IMRO national codification of land-use is in sufficient alignment with the intentions of the business manager’s intentions. In other words: would the requirements of most business managers (restaurant) sufficiently well map with the governmental categorisation of land-use and would OWL technology enable such a mapping between the production side (IMRO) and the user side? It is the question if the IMRO based land-use term would provide enough mapping possibilities that select relevant regulations for many business manager needs (like establishing restaurants). I consider the issue that the terms used by the government may be different from its citizens as out of scope for experiment II. Semantic consistency based on RDF/OWL provides some of the technical means for this alignment. Quoting Newell, Hoekstra points out some of the all-time difficulties of representation (Hoekstra 2009, pp. 21,81). Lemmens has provided a definition for this part of the service infrastructure that our team attempts to build in practice. He defines a ‘semantic interoperability framework’ as the combination of ontologies, their relationship, and methods for ontology-based description of information sources (services, data sets, etc). The framework serves the semantic interoperability between information sources. Lemmens concentrates on geo-related queries that look very similar to our needs for a query that provides the text-to-map functionality. The reasoning of the software is provided by what he calls ‘Geo information matching’ (Lemmens, P.139, 2006). The reasoning based on ontologies requires exact definitions. This is not always feasible and therefore a lot of effort is given to the design of filters that allow for imperfect matches. Lemmens describes this type of fit between the query and the available sources as ‘partial matching’, (Lemmens, P. 90, 2006). He quotes Zarimski and Wing, who state that; ‘for example in software component matching it is rarely the case that we aim for an exact match between the components, but rather a close one, and so, sacrificing ‘precision (the proportion of retrieved documents which are relevant) for recall. Initial precise queries may be relaxed for that reason’. Hence, we use term ‘alignment’ since technology using models of reality has imperfect mapping to that reality. In Chapter [VII], I will elaborate on the “digital bureaucrat” trying to fill the gap between the limitations of digital technology and the policy intentions of the legislator. Perfect consistency is hardly achievable and our test with real users should take this into account. In Chapter [VI], I will elaborate more on the relation between policies and legal constraints. I will not elaborate on the usage of OWL in legal knowledge management systems beyond pointing out that the web ontology language has been successfully applied in several legal applications like Clime, (Winkels et al 2002), DALOS (Angnoli et
al., 2009) and IPRonto (Delgado and Garcia, 2003). Hoekstra gives a thorough example of semantic technology and the application of OWL in the legal sector, (Hoekstra, 2009, p. 129, Hoekstra et al 2010, p. 151). The author describes the intentions of the LKIF, the Legal Knowledge Interchange Format. This format is meant as a standard to maintain consistency during the whole chain of publishing, incorporating, extending, complying with, enforcing and implementing legal information (Hoekstra, 2009, p. 124).

Ad 2. Efficiency

The technical approach towards content efficiency leads to the notion of a content infrastructure and the possibility for content (source) owners to maintain their own part of the whole infrastructure. The point of such a generic infrastructure facility is to avoid each subsystem having to provide for its own service separated from the other “silo”. In our water piping analogy in Chapter [II], this is similar to a generic water supply using piping systems versus individual village wells.

Solution 2:

Operationalisation within the context of our feasibility test implies that the technology applied should be based on the Internet and on the Base Registry Structure (stelsel van basisregistraties90) with registries such as ‘address’ and ‘geographic object’91.

Ad 3. Integrated multi-sector process:

The integrated process as described earlier refers to the standardisation of multiple sectors: housing, economic land use, agricultural land use, culture land use, etc. The legislators and permission processors have to deal simultaneously with many sectoral and pluriform legal views on the same business plans. The permit processing is done using workflow systems and on-site inspections.

Solution 3.

The CEN/METAlex XML notation (Boer et.al 2006) provides the means for multi-sector and multi-platform integration in these workflow systems. It also provides machine-to-machine transferability of norm texts, articles, and explanations which together constitute laws as we know them. A regulation written in Microsoft Word is only readable by people, whereas a regulation written in CEN/METAlex is highly structured. Legal information organised in such a way affords for interpretation and exchange by computers. I will elaborate on CEN/METAlex below.

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90 The Dutch National standardisation Forum uses the term ‘stelsel’ for infrastructure, emphasizing the relationships between elements creating an infrastructure (Abrahams, 2009, p.12)
91 See also BAG and http://www.digitaleoverheid.nl/onderwerpen/stelselinformatiepunt/stelsel-van-basisregistraties
Ad 4: Legal consistency and standard processing:

The content management solution as described above requires an additional exchange layer or infrastructural solution acting as a “carrier” of the content standardisation. This is called the webservice architecture layer. This layer of standardisation developed into the so-called webservice-based information exchange (Service Oriented Architecture, SOA) in the years 2005-2010. This networking technology allowed for local maintenance by the content owner and consistent distributed usage by (for example) many different local and regional authorities over the internet.

Solution 4.

In my feasibility test, I will apply Oasis (Organization for the Advancement of Structured Information Standards) principles on law and legal service design. The Oasis standard is aimed at improving interoperability issues between IT systems. In Europe many initiatives have been taken to enhance interoperability including the ones started by the European Commission, such as IDA and IDA-BC39. The European Commission, uses the term “interoperability (alignment) frameworks” for infrastructures that are intended to enhance such interoperability.

The European and the Dutch eGovernment architecture bodies have all adopted the design principles of OASIS, and important standards such as NORA 2.0, IDA and IDA-BC92 and the follow-up ISA all are intended to help improve interoperability and allow for standard processing of information.

Ad 5: User-centred design and opportunity finding:

The first proof of concept did deliver a form of service, enabling map-to-text opportunity finding. The business manager requires a service that would provide a solution provided by government, rather than the client endlessly browsing all possibilities. Opportunity finding from map–to-text retrieval or case assessment has been described as relatively easy. The other way around (Solution provision) has been described as much more complex.

Solution 5

The main reason for applying IMRO as link between a set of regulations and the relevance for a precise location is that it adheres to those three requirements. I will elaborate on the special nature of IMRO below. In addition to the usage of IMRO for interoperability, Hoekstra argues that map based approaches to legal service infrastructures helps to bridge the text based unstructured technology with the object oriented map based technology. Object-oriented systems are considered a main architecture principle in software development. (Hoekstra et al, 2010, p. 147)

Ad 6. Flexibility, continuity, maintainability and consistency of legal content

The legal sources and the related documents change over time. Permit structures, permissions and locations vary. The First prototype that was tested in Experiment [I], was maintained manually and any change would render the system consistency corrupt. A stable infrastructure requires a stable connection between the norm, the location and the land use. The temporal aspects of flexibility and maintainability of information service infrastructures cannot be underestimated. Jan Truijens, former chairman of the Dutch conference on information architecture, dedicates half of his PhD-dissertation to the notion of “Qualitime”: The architecture based information infrastructure that enables sustainability over time.

 [...] “Daarbij speelt altijd de vraag: zit er nog rek in de voorzieningen en is elasticiteit voldoende gewaarborgd of is de rek eruit en zijn structurele maatregelen nodig. De vraag is natuurlijk om welk type maatregelen het dan gaat en of die maatregelen een tijdelijk of een bestendig resultaat geven. Deze vraagstukken dragen alle drie een tijdsaspect in zich. Kunnen de bestaande voorzieningen nog lang mee? Is de kwaliteit van de voorzieningen toereikend en zit er nog rek in? Zijn structurele maatregelen mogelijk en welke daarvan zijn bestendig? Die vragen over de kwaliteit van de (informatie-)voorziening en over het tijdsaspect daarin komen terug in de ondertitel van deze dissertatie: waarborg voor de kwaliteit van de informatiehuishouding.” [...] The above translates as: [...] “It is always the question with these thing, whether there is still room for maneuvering with the existing services and whether the flexibility is ensured enough, or whether it is stretched to its limits and structural measures are necessary. The question is, of course, what type of measures is required and if those measures will provide temporary or sustainable solace. The questions all have a temporal aspect to them. Will the parts of the existing platform have some lifespan left?. These questions about the quality of the information platform and the temporal aspect of that quality is visible in the title of this dissertation: Information infrastructure, guarantees for the “qualitime” of the information platform.” [...] (Truijens, 2010, p 38). Truijens is actually more focused on the organizational information platform rather than the governmental information provision infrastructure, but his point is clear: in the complex world of IT changes and interdependencies: well-chosen sustainable standards are part of good design, because the costs of unbalanced short lived flexibility versus structural stability can become disastrous.

Solution 6:

Standardisation of content portability. Technological development with respect to content-infrastructures is often closely related to standardisation efforts. By structuring content in ways that comply with agreed conventions, the integrity of the content is preserved while being exchanged among different platforms and different applications over the internet. As stated earlier, the most challenging effort for this research was to bridge two ‘families’ of standards, which were hitherto not combined so often; the standards related to digital maps and those related to law. In what follows, I will provide an overview of that effort below. The choice of IMRO as fundament for a legal service infrastructure was based on assumptions about the built-in link between legal articles and geographic location. Another reason for choosing IMRO was its envisioned stability as a future “Base registry”.

181.
In a number of publications I have described the search for a stable and maintainable fundament for service delivery towards business managers: [...] “The whole point is to enable a consistent and maintainable legal map of The Netherlands, that allows for questions like: I want to establish a business, start a recreational facility, build a house, etc, so where would this be possible??” [...] (Peters and Wilson, 2004, Boer, van Engers and Peters, 2005).

In 1999, the Dutch Ministry of housing and spatial affairs (VROM) started a campaign to promote the digital exchange of zoning plans between and among different tiers of government and among agencies. According to the DURP expert group there were over 25,000 spatial plans in use in The Netherlands. According to the CBS bureau of statistics these plans were consulted over 2500 times a year for a provincial authority. An average city of 35,000 inhabitants had 1250 contact moments at the help desk at the city counter, of which 750 were done by real estate agents and 500 by citizens. 30,000 building permits were granted each year. The costs of a spatial plan were calculated to about 150,000 Euro on average. This campaign resulted in the Informatie Model Ruimtelijke Ordening (IMRO93), which stands for information model for Spatial Planning. It is based on NEN 1878, the Dutch Spatial standard. (I acknowledge decades of debate about the Dutch concept of ‘inrichting’ (facility) which is a set of environmental norms applicable to the facility-type of a desired activity, but this was not normalized or digitalized at the national level at the time of this research (Uylenburg, 2014).

Figure 8: IMRO Table, DURP programme, 2004.

93 http://www.ruimtelijkeplannen.nl/web-roo/
The IMRO commission suggested a workable codification for specific zoning areas. Those areas are inseparably linked to the relevant zoning law and the relevant municipal policy document related to that neighborhood. This triangle provided us with a stable architectural solution for two problems: retrieval and representation. The retrieval mechanism was originally based on the numeric codification of the zoning area. The IMRO geo standard and semantic standards have been adopted and extended in 2003 by the umbrella organization of all twelve Dutch Provinces (IPO), which means that the coding would be country wide and vertically integrated among an important group of government agencies. DURP and IMRO, with its link to digital and legally binding spatial plans could be viewed as the first de facto legal SDI in operation.

The Dutch spatial standardization organization, RAVI, adopted the international Geographic mark-up language (GML-2 version of XML standard set up by the openGIS consortium and the W3C) for the next version of IMRO. In 2006, IMRO 2006 was thus updated to accommodate (GML) that corresponded with the Dutch NEN 3610 base model for geographic object description (Ravi, Amersfoort, P. Janssen 2006). IMRO 2006 also contained the digital and semantic standards for spatial plans at Regional and National level. IMRO2008 is listed in the list for acknowledged standards at Dutch National level. Later this was incorporated into the IMgeo2 standard maintained by Geonovum. It should provide a solid foundation for text-to-map retrieval.

The pros and cons of this IMRO based standardisation approach were explored in detail for the legal domain and is described in Boer, van Engers, Peters and Winkels, 2007.

4.3.2. Standards required in the Legal domain

There is an increased interest for a jurisdiction-independent standard that can be used for both the exchange of information, as well as a platform for the development of editing and management tools. (Breuker, Boer, Hoekstra, Winkels, Glassee, Willaert and Van Engers, 2002).

In 2002 the Leibniz Center for Law has developed an open, extensible semantic framework standard for storing and working with legal information (e.g. laws, regulations, permits, and spatial plans) called CEN/MetaLex (Boer, Hoekstra and Winkels, 2002).

CEN/METALex is a generic open standard for legislative documents specifically designed to facilitate the maintenance of decision support software. In addition, it offers provisions for the purposes of presentation, description of the relations between legislative documents, search and filtering on meaningful levels of detail, and version management as well as file exchange and search engines. METALex is limited to the few features that regulatory documents from all different jurisdictions have in common. ). It has been designed so that it can be embedded in technologies for legal knowledge representation, code generation,

94 https://lijsten.forumstanstaardisatie.nl/wet-en-regelgeving/informatie-model-ruimtelijke-ordening
95 http://www.metalex.eu/
rule generation, and verification of legally relevant ‘contents’. Application of the principle results in a simple and generic but also rather ‘trivial’ structure that does not meet specific requirements of potential users. To allow for these specific needs, it is made possible to add custom extensions to the schema. Extensibility of METAlex XML elements was realized with the XML schema language. The CEN/METAlex standard is specified in W3C’s XML schema and RDF, and supports features from standards such as (X)HTML and XML Linking Language (XLink) (Boer, Hoekstra and Winkels, 2002). CEN/METAlex allows extensions in the form of RDF or OWL schemas to cater for specific user communities committed to using CEN/METAlex. This option is also open to spatial planning. The CEN - documents. CEN/METAlex XML standardizes structure and designation of identity of legislation. It treats legislation as a document, and any other attached materials, like tables, as unstructured appendices to the document. The XML structure can be translated with XSL style sheets to RDF conforming to a Web Ontology Language (OWL) schema. OWL makes it possible to define and instantiate ontologies and is in turn based on technologies such as XML(S) and RDF(S) but adds extra vocabulary to facilitate greater machine interpretability (e.g. relations and restrictions), (McGuinness & Van Harmelen, 2004). The code in which MetaLex and other standards using these technologies is written is not meant to be read by human beings, but is ‘merely’ used to give meaning and bring structure to data to facilitate the inner workings of computer programs (Boer, Hoekstra and Winkels, 2002).

Defining legislation-related concepts for different jurisdictions in a single RDF dictionary makes it easier to identify similarities and differences (Sloots, 2011, p. 31). The standard itself does not commit to specific viewpoints on the contents of the regulation. The professional user of legislation today has to keep an eye on regulations from several legislators (for instance municipal, water authority, provincial, national, EU, and international for a civil servant in the Netherlands), and special-purpose software to support decision-making processes is affected by – and may have to manipulate – legislation that conforms to many different standards for legislative drafting and is delivered in as many different formats.

4.3.3. CEN/METAlex and Geographic standardization combined

The general XML standard for representation of geospatial data is the Geography Markup Language (GML) of the Open Geospatial Consortium. Geography Markup Language is an XML language defined in XML Schema for the modeling, transport, and storage of geographic information. GML 3.2.1 is also the core of IMRO 2012 and NEN 3610/IMgeo, the

96 http://www.w3.org/RDF/
97 http://www.w3.org/TR/owl-features/
98 Even advocates of other semantic modeling approaches agree that OWL provides a easy to use method for semantic interoperability modeling (Abrahams, 2009, p. 42)
99 http://www.opengeospatial.org/
The key concepts used by Geography Markup Language (GML) to model the world are drawn from the OpenGIS Abstract Specification and the ISO 19100 series of specifications. GML provides a variety of kinds of objects for describing geography including features, coordinate reference systems, geometry, topology, time, units of measure and generalised values. A geographic feature is a ‘real world phenomenon’ associated with a location relative to the Earth. Thus a digital representation of the real world can be thought of as a set of features. The state of a feature is defined by a set of properties, where each property can be thought of as a {name, type, value} triple. The number of properties a feature may have, together with their names and types, are determined by its type definition. Geographic features with geometry are those with properties that may be geometry-valued. A feature collection is a collection of features that can itself be regarded as a feature. As a consequence a feature collection has a feature type and thus may have distinct properties of its own in addition to the features it contains. The triple model of GML naturally maps to the W3C’s RDF, (Resource description Framework, a data interchange framework established by the W3C to provide easy access and semantic interoperability) and GML’s serialization profile 3 defines an RDF data model for GML. This means that geospatial objects in GML can be referenced by URI as RDF objects, which opens up interesting perspectives for the integration of CEN/METALex XML and GML. (Boer, Peters and van Engers, 2006). Spatial regulations can be captured in CEN/METALex XML. Translating spatial regulations to METALex is straightforward and linking geospatial references to CEN/METALex XML is not difficult to model. There was a consensus in DURP, the Dutch Digital Planning initiative described in Chapter [I], that the GIS-aspect of spatial regulations should be represented in GML, using the existing IMRO land use scheme (Winkels, 2007). IMRO was based on the same data model, and therefore completely compatible with GML. GML provides a variety of kinds of objects for describing geography including features, coordinate reference systems, geometry, topology, time, units of measure and generalized values. Linking a CEN/METALex RDF representation of a spatial regulation to the associated map is not a problem from a technical point of view. Therefore it is feasible.

Another relevant source of standardization is the INSPIRE directive (INSPIRE, 2007/2/EU). This European Spatial Data infrastructure is a well-defined source of domain keywords, metadata, governance models and best practices. The Dutch have implemented INSPIRE through National legislation in 2009. The full legal text can be found at: http://wetten.overheid.nl/BWBRO026158/geldigheidsdatum_10-04-2012. INSPIRE uses SKOS-based categorisation of vocabularies, which is compatible with OWL.
It defines ‘interoperability’ and ‘infrastructure’ in legal terms. The use of GEMET in experiment [III] is based on INSPIRE and will be described later in Chapter [VII].

As stated earlier in this Chapter, one can find an abundance of views on infrastructures in spatial research. This area of research (about Spatial Data Infrastructure, Crompvoets and Bregt, 2012, van Loenen, Bezemer and Zevenbergen 2009) provides lively discussions about technology and measurement of Spatial Data infrastructures. The concept of a legal service infrastructure seems remote from geo-oriented SDI research, but with a closer look it seems clear that INSPIRE, cadastre development, the discussion about electronic permit provision like the ‘omgevingsvergunning’ and environmental constraints visualisation all have strong links with legislation. A combination of SDI and LIS principles seems feasible.

One of the latest development with respect to the bridge between map–objects and legal texts has been the recent acceptance of the Stuf-Geo standard that enables legal object status mutation by means of structured document workflow\textsuperscript{104}.

Paul Oud Luttighuis provides an excellent overview of implementation of these and other standards in his ‘Landscape semantic interoperability’ (Oude Luttighuis, 2012).

Conclusions feasibility question step 1

The research question on feasibility of building a legal service infrastructure (LSI) has been answered. I can substantiate that it is plausible that we can realize a legal service infrastructure by using existing architecture principles and solutions.

\textsuperscript{104} \url{http://www.geonovum.nl/onderwerpen/bgt-imgeo-standaarden/nieuws/berichtenstandaard-stuf-geo-imgeo-online}
4.3.4. Design feasibility question step 2:

Feasibility test in practice: Building an infrastructure based on accepted architecture principles

The previous sections make it plausible that the required infrastructure can be build, however I still have the burden of proof that we actually can build such infrastructure. The next sections describes the proof-of-concept built by our living lab team that will provide this evidence. This proof of concept would later be called “Legal atlas” (Peters and Wilson 2004).

Legal Atlas II is an application which enables dynamic references between legal information encoded in MetaLex and associated geo-spatial information encoded in IMRO2006.

The IMRO2006 model – that is now replaced by the IMgeo2 model – contained all standard definitions to allow Dutch municipalities to encode their spatial plans. It is compatible with GML (Geography Markup Language), the XML grammar defined by the Open Geospatial Consortium (OGC) in order to express geographical features. The three types of knowledge described above come together in the application: knowledge of textual regulations, knowledge of spatial plans, and geographical knowledge. Their related knowledge models were available (MetaLex and GML) or have been converted (IMRO) into a similar format: an ontology described in OWL. On top of these a new ontology could be built for Legal Atlas. This Legal Atlas ontology imports the other three ontologies and forms a layer connecting them, making it possible to query ingoing and outgoing references for any element. Doing so automatically makes one-sided references two-sided (map-to-text and text-to-map). It also renders the text-to-map relation legally binding and legally maintainable.

Technical implementation

Legal Atlas (Peters and Wilson 2004) was programmed in Java and incorporates existing modules to perform some necessary process. E.g.: Jena for storing the structured data, a SPARQL query engine, and OpenJump for visualizing the geographical data. The application ofCEN/METALex to the geospatial domain has also led to a change of CEN/METALex itself. Version 1.3 now uses an attribute ‘region’, with a URI, to refer to the region to which the source applies. This is to be distinguished from references in the content of the legal source to geospatial objects or classes of objects. The presence of this simple attribute will hopefully encourage legislators to define and make available information about their spatial jurisdiction in GML and OWL.

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106 OpenJUMP Website: [http://openjump.org/wiki/show/HomePage](http://openjump.org/wiki/show/HomePage)
Putting everything together, The Legal Atlas proof of concept should enable end-users to browse legal information in a two-way direction: using a map to navigate areas of interest that link to the appropriate legal documentation or vice versa; browsing a legal text containing icons that will highlight all areas on the map in which the legislation applies. (Hupkes, Legal Atlas, August 2007). For example: a user is able to select an area on the map by clicking on it. The program would subsequently link to (sections of) legal documentation describing that area, for instance ‘housing’, and the regulations that apply there. This also functions the other way around: a user is able to browse through a legal document, arrive at the section for ‘housing’, and click on the link. The map interface will subsequently highlight all areas to which this part of the legislation applies.

On the next page, some images of both sections of the interface are displayed (see figure below). This version for the proof of concept was built in the Java Developing Framework Eclipse. The spatial plan text files have been created using the MetaVex Editor, a MetaLex regulation-drafting environment (Van de Ven, Hoekstra, & Winkels, 2007). Where OWL files had to be modified to create references or new objects TopBraid Composer was used.

http://www.eclipse.org/
http://www.topquadrant.com/topbraid/composer/
Figure 11: Proof-of-concept Map interface: ‘Legal Atlas’.

Figure 12: Legal atlas showing the relevant legal text related to water after choosing the water area on the map.
Conclusions feasibility question step 2

- The technical feasibility for applying proper architecture principles has been substantiated.
- The feasibility of low cost maintenance of content has been made plausible
- The feasibility of legal consistency has been substantiated
- A working technical proof of concept has been built

Since the proof-of-concept for a legal service architecture (LSI) has been delivered, potentially, we could design a real life legal service infrastructure. This infrastructure would be based on legal principles (consistency, etc) and would result in a cost efficient and effective solution. In our quest for legitimacy of our legal system, this is relevant as it demonstrates that potentially we could design a solution that creates a user centered version of access to law, a necessary ingredient for legitimacy.

Another question is if people would actually use such an infrastructure. During this phase of my research, a number of additional requirements for a legal infrastructure became apparent. This caused me to continue the research by implementing the ideas in the real world and real people who have something at stake. Part of those requirements came from the statements of participants in the research that "in the real world people decide differently"
(lebenswelt again) and ‘there is usually an economic side to the thing’. Grimmelikhuijsen, in his research about transparency and trust in government, already pointed out that vulnerability has to be part of the experimental setting (Grimmelikhuizen, 2012, p. 36) Another part of the additional requirements had to do with legal co-creation or co-regulation, on which I will elaborate further in Chapter [VI]. First, however, we will use the proof of concept to investigate the usability of the text-to-map user access to law using a proper scientific method. This is the purpose of Chapter [V].
Experiment [I I]

A service infrastructure supporting legal effect planning
[...] Als er architectuur ontwikkeld wordt die niet maakbaar is of overduidelijk niet past in de betreffende domeinen, verliezen architecten elk respect en worden ook goede ideeën niet meer serieus genomen’. Translates as: [...] “If ICT-architecture is developed without taking into account the practicalities of implementation, or which is clearly not in alignment with the chosen domain, architects lose all respect and even good ideas are not taken seriously.” [...] (Jan Truijens, former chairman of the Dutch Board of ICT Architects, Dissertation, 2010, p.6)

Research questions of Experiment [II]

This is an investigation in the contributions and challenges of technology to the legitimacy of law. Three areas of contribution to legitimacy were stipulated, namely: 1) case assessment and knowability; 2) legal service infrastructure and legal effect planning; 3) policy formulation and co-creation of law. In Experiment [I], I have investigated the contribution of an elaborate visualisation of legal information applying digital mapping technologies. This technical solution appeared to improve accessibility of legal information for the purpose of case assessment and legal effect planning of business managers, their advisers, and government officers. The government authorities were explicit in their expectation of lower costs, better maintenance, and better service provision; however, they had strong doubts about feasibility. In Chapter [IV], I have addressed the feasibility of this approach. As discussed in Chapter [IV], the users expressed their liking of the approach as something almost ‘native’ to the tasks they had to perform and this technical solution area looked promising. The research question in this chapter is to substantiate the claim that the new technology is indeed appreciated by the users and that the uptake of this technology does not encounter too much resistance. Such resistance in the uptake of new working methods involving new technologies can derive from many reasons (Pajo and Wallace 2001), including:

- Steep learning curve
- Resistance to change in general
- Perceived lower efficiency in the tasks
- Perceived lower accuracy of output
- Anxiety because of jobs replaced by automation
- Usability
- etc.

Folmer and Bosch claim is that architecture and usability go hand in hand: ‘Changes that relate to the interactions that take place between the system and the user are likely to require a much greater degree of modification. Restructuring the system at a late stage will be extremely and possibly prohibitively, expensive. To improve on this situation, it would be beneficial for knowledge pertaining to usability to be captured in a form that can be used to inform architectural design, so that engineering for usability is possible early in the design process’ (Folmer and Bosch, 2004).

I support the notion that legal service design architecture and the usability for business manager or NGO professional both have a relationship with a preference of business
managers, their advisors, and suppliers of legal source material. I have some indicative substantiation of these two relationships from Chapter [III]. In order to further investigate the relationship of usability and preference, I need to experimentally test the usability issues. One of the issues in Experiment [I] was the lack of formal and structured interviewing method. To improve the repeatability of the experiment and, consequently, to boost the strength of the research claim of increased communication discourse and, therefore, more legitimacy, an additional approach will be used in this chapter. I will now address the issue of a formal testing method for the acceptance and inhibitions of a digital map-based system for the people coming from the tradition of paper methods for legal planning and case assessment. The test will focus on the issue of usability of the technology. In order to feed the debate on usability tests of legal software in general, the process is described in detail. The work inscribed in this chapter built partly on research that was published earlier in a master thesis by Dave Thijssen for which I acted as one of his supervisors.

5.1 Design question of usability: testing with repeatable methods

The focus of Experiment [II] is on the presentation layer of software that helps to find legal source materials in a use case context and on the usability of such presentation. For the sake of replicability, it is necessary to choose an established human computer interaction method to measure the relationship between interface aspects and user preference. Given the insights of affordances and their relevance for maps as useful instruments in the field of law, I see the benefit of exploring more evaluation methods. This research does not focus on the usability measurement methods, but, rather, on legitimacy. Therefore, I have to limit myself to established approaches that meet my criteria. These criteria for the test method are as follows:

- Well-established and acknowledged in the field
- Standardised and validated
- Validating by small sample of users
- Available in Dutch
- Broader than ‘traditional’ front end usability of websites towards affordances and functionality

5.1.1. The experimental design model

In Experiment [II], we will test the contributions of a subset of tasks that fit a representative use-case scenario. This subset concerns the representation side or ‘front-end’ of the technological solution. The test in Experiment [II] does not concern the supportive aspects of the legal service infrastructure side or the supportive aspects of automated legal
reasoning engine – ‘the back-end’ – as part of the technology solution. Rather, the representation side is that part of the solution that provides functions for the user as represented on an information carrying device (paper, screen, book).

**Addressed in Experiment [II]**

- Function F1: maintenance of legal and other content
- Function F2: integration with existing systems and procedures
- Function F3: maintaining consistency

**Not addressed in Experiment [II]**

- Function F4: viewing relationship between location and legal status
- Function F5: opportunity finding

### 5.2. Design of the test protocol for Experiment [II]

Experiment [II] addresses the needs of business managers and their advisors to perform their tasks without too many legal problems. Those needs have been described as seeking the relevant information to find out if it would be possible to do business on a new location such as:

- **Use-case**: establishing a LPG gas station in a new city or town
- **Use-case**: organizing a large recreational event
- **Use-case**: assessing the value of real estate

These cases evolved from observations and discussions with clients of [www.overheid.nl](http://www.overheid.nl) and the advisors of those businessmen. During the interviews in Experiment [I], it was established that business managers and their advisors also require support for legal effect planning for opportunity finding. This service provides solutions and opportunities from the system itself, rather than requiring the business manager to explore all locations. These business needs have to be translated to a concrete task description with the right use-case properties. The System has to be described in functions that allow the execution of those tasks. A use-case can then be tested in an experiment against the task performance of the system.

- **Function 4**: Establish which norm is valid in a certain region or area that has an effect on a certain business activity;
  - Task: retrieval of areas where a specified norm is valid.
- **Function 5**: Establish in which areas(s) certain legal data (norms) are valid;
  - Task: identification of all areas where the effect of a certain norm exists related to the business activity and only that norm.
There are also two complementary sub-functions, namely:

- **Sub-Function:** View (part of) a map of an area;
  - Function: identification of specific areas among other affected areas that have a relation with the norm.
- **Sub-Function:** Read a (piece of a) legal document to identify the norm;
  - Function: representation of a related legal norm.

Function 5 arouses some methodical questions regarding the ‘fair’ comparison between a digital system and a paper-based ‘traditional’ system. Digital systems have an advantage over paper systems when:

- Large amounts of data can be processed (size);
- Complex queries can be compiled (complexity);
- Result-representation of queries in colours or textures or icons are made possible by visualisations of adjacency and contrasts (visualisation).

I want to eliminate the advantage of the processing capabilities of computers in this test. We have therefore limited the amount of source material to be processed for the use cases to maintain a fair comparison between digital and paper methods.

### 5.2.1. Choice of user group and sample

Dix, Finlay, Abowd, & Beale (2004, p. 329) recommend a minimum of ten participants for an interaction study like the one presented here. As stated in the introduction, Legal Atlas intends to target experienced professionals, so the sample should include a variety of participants from the field at stake.

**General Properties**

The sample size (N) was established at 15. The user type includes exclusively professionals who, in their daily work, deal with a combination of legal and geographical data. A range of various individuals in the Dutch governmental (mainly municipality), as well as business positions, have participated. The list below (see Table 1) provides a general idea of the kinds of professions that were included in the research.

**Alpha-Level**

Because our sample (15) is relatively small, I decided to predetermine the alpha-level, i.e. the level at which the results are considered to be significant, at 0.10, or 90% certainty. This implies that there is a requirement that there is a 90% chance that the outcome of the test is not caused by coincidence.
Grouping

Table 1. User Dataset.

<table>
<thead>
<tr>
<th>ID</th>
<th>Date</th>
<th>Gender</th>
<th>Age</th>
<th>Profession</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11-Mar-2008</td>
<td>F</td>
<td>31</td>
<td>Senior Consultant</td>
</tr>
<tr>
<td>2</td>
<td>17-Mar-2008</td>
<td>M</td>
<td>36</td>
<td>Adjunct director/ head of Urban Planning</td>
</tr>
<tr>
<td>3</td>
<td>18-Mar-2008</td>
<td>M</td>
<td>41</td>
<td>Director planning consultancy agency</td>
</tr>
<tr>
<td>4</td>
<td>19-Mar-2008</td>
<td>M</td>
<td>46</td>
<td>Lawyer</td>
</tr>
<tr>
<td>5</td>
<td>02-Apr-2008</td>
<td>M</td>
<td>51</td>
<td>Senior consultant Spatial planning</td>
</tr>
<tr>
<td>6</td>
<td>18-Apr-2008</td>
<td>M</td>
<td>61</td>
<td>Urban Planner</td>
</tr>
<tr>
<td>7</td>
<td>23-Apr-2008</td>
<td>F</td>
<td>62</td>
<td>Lawyer, project manager spatial planning</td>
</tr>
<tr>
<td>8</td>
<td>25-Apr-2008</td>
<td>M</td>
<td>55</td>
<td>CIO</td>
</tr>
<tr>
<td>9</td>
<td>07-May-2008</td>
<td>M</td>
<td>59</td>
<td>Regional coordinator enforcement (environmental permits)</td>
</tr>
<tr>
<td>10</td>
<td>21-May-2008</td>
<td>M</td>
<td>39</td>
<td>Manager</td>
</tr>
<tr>
<td>11</td>
<td>21-May-2008</td>
<td>M</td>
<td>33</td>
<td>Building design permit officer</td>
</tr>
<tr>
<td>12</td>
<td>22-May-2008</td>
<td>M</td>
<td>57</td>
<td>Manager Building and real estate</td>
</tr>
<tr>
<td>13</td>
<td>09-Jun-2008</td>
<td>F</td>
<td>39</td>
<td>Policy advisor chamber of commerce</td>
</tr>
<tr>
<td>14</td>
<td>17-Jun-2008</td>
<td>M</td>
<td>42</td>
<td>Real estate broker</td>
</tr>
<tr>
<td>15</td>
<td>20-Jun-2008</td>
<td>M</td>
<td>46</td>
<td>Real estate broker</td>
</tr>
</tbody>
</table>

5.2.2. User group properties

Familiarity & Skills

In the beginning of the survey, the participants were asked to judge their own skills on a scale of one to six. As is shown figures 2-4, the bars combined weights are concentrated on the right and in the medium to high parts of the scale. On average, the participants indicated to be reasonably familiar with legal data, geographical data, and computer software.

Figures 1-2-3 (figure 3 on the next page): Familiarity with legal data, geographical data, and computer skills.
Two types of systems were set up and tested against each other. These were defined as follows:

1. **Traditional (T)**
   This system consists of a static map, a legend, and a legal text (*see figure below*).

2. **Modern digital (M)**
   This system consists of a dynamic (electronic) map linking clickable areas to a legal text and vice versa. As the participants carried out each condition, the order of the execution was also documented, including the scenario with which they started. This order can also be considered an independent variable (*see figure below*).

*Figure 4: Traditional and modern systems.*
5.2.3. Use-case description

The use-case has to be representative of typical cases that look like those described in Chapter [IV]. These were the cases of LPG re-location, event organizing, and real estate value assessment. To establish the systems functional requirements, some use-case task scenarios were created. Use-case task scenarios describe the interaction between the actors – in this case, the end-user and the system (here, a prototype or mock-up of both traditional and modern systems). The use-case task scenario describe how, from the point of view of the actor, certain functions are attained to achieve business goals. These use-case task scenarios are useful for the following two reasons: 1) they can easily be converted into ‘stories’ that are easily understood, even by non-technical users. Those can be used as test scripts to instruct research participants of the task they are to perform; and 2) it also forces the developers of the system prototype or mock-up to thoroughly consider alternative possibilities to accomplish a business goal. This enhances the robustness of the system. In this research, we are interested in one particular system function. We would like to know how users seek specific legal information with a spatial factor. From the point of view of the end-user, we have defined two primary functions for the system, namely:

- Establishing which norm is valid in a certain region or area
- Establish in which areas(s) a certain norm is valid

Two complementary sub functions are included as well, namely:

- View (a part of) a map of an area
- Read a (piece of a) legal document

The UML task-diagram itself is system-independent (see figure 5). The scenarios or paths that lead to these goals differ between the traditional and modern systems (see figure 5).

Figure 5: System simple user diagram.
The modern system provides the following support to perform the tasks:

- A map-to-text function that is demonstrated here by the user clicking on a designated area. The area is then redlined and triggers the presentation of the relevant article texts about ‘bedrijventerrein’ or business area (see figure 6).

- A text-to-map function that is demonstrated here by the user clicking on the bottom-left button stating ‘op kaart weergeven’ (translates as ‘show on map’) for the legal allowance of the goal ‘wonen’ or ‘living’, thereby revealing on the map, all areas that are designated for the purpose: ‘living’ by law (see figure 7).

Figure 6: map-to-text function, showing the legal article when an area on the map is clicked on (a red lining appears) which is designated as business park (bedrijventerrein).

Figure 7: Interface from text to map showing ‘living’ designated area when ‘wonen’ has been selected in the right listing of legal articles.
The use-case scenario will now have to be translated into a number of tasks (a task scenario) for the test. Based on these use-cases representing the primary functions the users of the system need, it was possible to create a number of task scenarios. To establish the task scenarios, I made a list of the properties the task scenario should incorporate (see Table 2).

Table 2: Task scenario description

<table>
<thead>
<tr>
<th>MoSCoW List</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Must have</strong></td>
</tr>
<tr>
<td>• People must be enabled to solve a legal issue.</td>
</tr>
<tr>
<td>• This issue must contain a spatial factor.</td>
</tr>
<tr>
<td>• The scenario should have an average difficulty. It should not be either too easy or too difficult. If the scenario is too easy, it will require no real effort from the user and will not challenge the system under scrutiny. If the scenario is too difficult, the participants might get frustrated, which might bias the end results.</td>
</tr>
<tr>
<td><strong>Should have</strong></td>
</tr>
<tr>
<td>• Task scenarios should demonstrate the two-way directional information lookup activity, namely:</td>
</tr>
<tr>
<td>1. a query from a legal text with a norm to a specific location where that norm is applicable;</td>
</tr>
<tr>
<td>2. a query from a location of activity to the legal text about the norm.</td>
</tr>
<tr>
<td>The added value of the Legal Atlas (modern) system is its ability to allow users to look up information starting with map information and being linked to text or browsing text and highlighting applicable areas on the map. If, through the scenario, we guide people in the direction of using this feature, we are able to research the usage of this function and collect opinions and preferences about it.</td>
</tr>
<tr>
<td>• Scenarios should be recognizable; participants should be able to identify its relevance. A recognizable scenario is more representative and might even add to the fun factor, since people are more likely to relate to the problem, perceive the system as something useful, and are better able to solve the problem which could lead to a feeling of accomplishment. Scenarios should contain types of information that are publically available.</td>
</tr>
<tr>
<td>• Scenarios should take a reasonable amount of time to complete.</td>
</tr>
<tr>
<td>• Scenarios have to be of a limited size.</td>
</tr>
<tr>
<td>• Scenarios have to be of limited complexity.</td>
</tr>
<tr>
<td>• Visualization and differentiation of the results should not be an issue.</td>
</tr>
<tr>
<td><strong>Could have</strong></td>
</tr>
<tr>
<td>• A representation of a legal problem generally encountered by experts.</td>
</tr>
<tr>
<td>• A representation of a legal problem generally encountered by citizens.</td>
</tr>
<tr>
<td><strong>Won’t have</strong></td>
</tr>
<tr>
<td>• Advanced support functions, such as exporting, printing, networking, and so on.</td>
</tr>
</tbody>
</table>
The scenario chosen for this experiment was the retrieval of information from a spatial plan of the city of Drachten, 2008. This Spatial plan analyses problems in the city of Drachten and is in not special in any respect. It can be viewed as representative for a routine business opportunity seeking problem.

Therefore, the independent variables were:

- Independent variable ‘Traditional System’ or ‘Modern system’
- Independent variable ‘Use-case I’ or ‘Use-case II’ from text to map or from map to text
- Independent variable ‘Scenario 1’ or ‘Scenario 2’

The variable Scenario 1 or 2 was used to uncover a potential learning effect. To identify any potential influence caused by the order in which people worked, the independent variable ‘order’ between starting with either the traditional or the modern system was changed as well.

### 5.2.4. Hypothesis

The research question ($H_1$) of the Experiment [II] is, that professionals dealing with a combination of geographical and legal data are better able to solve a legal issue featuring a spatial factor using a geographical information system than they are when using traditional paper methods using texts. The null hypothesis ($H_0$) states that no considerable effect will be measured in this regard.

Therefore, the design question could be summarised as follows

The design question would be confirmed if:

1. The majority of users are better able to work with the digital system than with the traditional system.
2. The majority of users prefer the digital system over the traditional system.
3. The majority of users prefer the text-to-map opportunity finding to the map-to-text search (the affordance of opportunity finding).

The concept of ‘better’ will be operationalised under item 1 using the following two parameters:

1. Improved working speed (represented by the measured times)
2. Improved accuracy (represented by the number of points scored)

“Preference” will be operationalised as follows:

3. Giving more working pleasure, confidence, or feeling of control to the user (represented by indicated preferences using the additional questionnaire)
5.2.5. Dependent Variables

I measured the ‘time’ (Dependent Variable₁); it took a person to finish using stopwatch and video recording timestamps. The dependent variable Time is relevant for the comparison of the performance of the digital and the traditional systems with regard to speed.

The dependent variable ‘accuracy’ (DV₂) was also recorded. The quality of the solution was studied by measuring if the outcome could be categorized as: 1) ‘incorrect’; 2) ‘correct’; or 3) ‘optimal’. The variable ‘Accuracy’ is relevant for the comparison of the performance of the digital and the traditional systems with regard to effectiveness. The way in which ‘correct’ and ‘optimal’ are distinguished will be explained later in this Chapter.

The work processes applied by the participants were extensively recorded and documented using qualitative research methods (DV₃). The objective of the recording was to obtain qualitative information that would help with the subsequent analyses of the Quantitative (SUMI) information.

Control Variables

Through a questionnaire, we retrieved control variables: the participant’s age (DV₇), gender (DV₈), profession (DV₉), level of knowledge regarding legal data (DV₁₀), level of knowledge regarding geographical data (DV₁₁), and level of computer experience (DV₁₂).

The control variables allow for the examination of whether the outcomes are caused by the effect of former experience or age or profession, so that they are separated from the effect of the difference in technologies used for the complete list of all recorded values (see table 3).

Table 3: Variables and methods.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Description</th>
<th>Scale</th>
<th>Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Independent Variable₁</td>
<td>• Traditional (map, legend, text)</td>
<td>Nominal [T/M]</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Modern (electronic map linking clickable areas to text and vice versa)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task Scenario</td>
<td>Independent Variable₂</td>
<td>• Task Scenario 1</td>
<td>Nominal [1/2]</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Task Scenario 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Order             | Independent Variable₃ | 1. Traditional Scenario 1  
                   |                       | 2. Traditional Scenario 1  
                   |                       | 3. Modern Scenario 2  
                   |                       | 4. Modern Scenario 2  
                   |                       | 5. Traditional Scenario 1  
                   |                       | 6. Traditional Scenario 2  
                   |                       | 7. Modern Scenario 2  
                   |                       | 8. Modern Scenario 1  
                   |                       | 9. Traditional Scenario 2  
                   |                       | 10. Modern Scenario 2  
                   |                       | 11. Traditional Scenario 1  
                   |                       | 12. Traditional Scenario 1  | Nominal [T₁M₂/M₂T₁] | -           |

A service infrastructure supporting legal effect planning
<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Description</th>
<th>Scale</th>
<th>Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Locally for each condition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Dependent Variable 1</td>
<td>How much time did it take the person to finish?</td>
<td>Ratio (Int)</td>
<td>Measurement of time through video and stopwatch</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Dependent Variable 2</td>
<td>Quality of the solution divided in ‘false’, ‘correct’ and ‘optimal’ (see paragraph scenario properties, p. 214)</td>
<td>Ordinal</td>
<td><em>Note: the scenario will include more than one solution, but a single optimal one.</em></td>
</tr>
<tr>
<td>Method</td>
<td>Dependent Variable 3</td>
<td>-</td>
<td>Textual analysis</td>
<td>Video or screen-recording followed by post-task walkthrough</td>
</tr>
<tr>
<td>SUMI Scores</td>
<td>Dependent Variables</td>
<td>-</td>
<td>-</td>
<td>Questionnaire (SUMI)</td>
</tr>
<tr>
<td><strong>Globally for the entire experiment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preference</td>
<td>Dependent Variable 5</td>
<td>e.g.: “Which method did you prefer?”</td>
<td>Ordinal [T/M]</td>
<td>Questionnaire</td>
</tr>
<tr>
<td>Age</td>
<td>Control Variable 7</td>
<td>-</td>
<td>Nominal (Int)</td>
<td>Questionnaire</td>
</tr>
<tr>
<td>Gender</td>
<td>Control Variable 8</td>
<td>-</td>
<td>Nominal [M/F]</td>
<td>Questionnaire</td>
</tr>
<tr>
<td>Profession</td>
<td>Control Variable 9</td>
<td>-</td>
<td>(String)</td>
<td>Questionnaire</td>
</tr>
<tr>
<td>Level of knowledge of legal data</td>
<td>Control Variable 10</td>
<td>-</td>
<td>Ordinal [1-6]</td>
<td>Questionnaire</td>
</tr>
<tr>
<td>Level of knowledge of geographical data</td>
<td>Control Variable 11</td>
<td>-</td>
<td>Ordinal [1-6]</td>
<td>Questionnaire</td>
</tr>
<tr>
<td>Level of computer experience</td>
<td>Control Variable 12</td>
<td>-</td>
<td>Ordinal [1-6]</td>
<td>Questionnaire</td>
</tr>
<tr>
<td>User comments (qualitative)</td>
<td>Dependent Variable 13</td>
<td>-</td>
<td>Qualitative</td>
<td>Questionnaire</td>
</tr>
</tbody>
</table>
To support testing the hypothesis that users prefer digital maps over traditional paper text for planning and case assessment, a measure of “usability” was included so as to account for a possible effect of usability upon user preference (as more usable may be more preferred).

SUMI was developed on the project by the Human Factors Research Group (HFRG, Software Usability Measurement Inventory: Human Factors Research Group, Cork, Jurek Kirakowsky, 1994). This generic usability tool comprises a validated 50-item paper-based questionnaire in which respondents score each item on a three-point scale (i.e., agree, undecided, disagree). SUMI measures software quality from the end user’s point of view. The questionnaire is designed to measure scales of: 1-Affect the respondents emotional feelings towards the software (e.g., warm, happy). 2-Efficiency the sense of the degree to which the software enables the task to be completed in a timely, effective and economical fashion. 3-Learnability the feeling that it is relatively straightforward to become familiar with the software. 4-Helpfulness the perception that the software communicates in a helpful way to assist in the resolution of difficulties. 5-Control the feeling that the software responds to user inputs in a consistent way and that its workings can easily be internalized. (Porteous, Kirakowski and Corbett, 1994).

The scores are divided into five categories: efficiency, affect, helpfulness, control, and learnability. The SUMI method was chosen for the following reasons:

Figure x: example SUMI test score to illustrate the scorings on different SUMI aspects.

The Figure shows the outcomes of an example test. It shows the scores of a Sumi test and the spreading of these scores (measured by the standard deviation), against the average score of the reference database, reflected by the value 50. Consequently, the usability scores shown in this sample test are positive, e.g. more than state of the art (reference database in 2007), with a reasonable spreading (Veenendaal, 1998).
The method is applicable to the map application.
SUMI is applicable to any software system that has a display, a keyboard or other data entry device, and a peripheral memory device such as a disk drive.
The requirement that there must be a working version of the product is not a serious limitation. Most software is created on the basis of improvements or upgrades to a previous version or in response to a market opportunity created by gaps in competitive products. Usability evaluation can therefore feed into the earliest stages of system specification, as well as enable the setting of usability targets to be achieved by the new system.
Its validity has been verified.
Three different kinds of validity studies have been conducted with SUMI. Firstly, the industrial partners used SUMI as part of the industry-scale validation of the “MUSIC” usability evaluation toolset (Kelly, 1994). Secondly, a number of laboratory-based studies have been carried out in the Human Factors Research Group. Thirdly, studies have been carried out for industrial clients on a consultancy basis. In addition to empirical validation, some theory-based validation has been carried out by comparing the SUMI subscales with the ISO 9241 part 10 dialogue principles. SUMI is indicated by Preece et al. (1994) as a standard method for assessing user attitudes; Dzida et al. (1993) see it as a way of achieving measurement of user acceptance in the context of the Council Directive on Minimum Safety and Health Requirements for Work with Display Screen Equipment (EEC, 1990). Davies and Brailsford (1994) also recommend the use of SUMI in their series of guidelines for multi-media courseware developers.
SUMI does not require a large sample.
By letting at least ten users respond to the questions, a statistically reliable rating for usability can be measured. The minimum user sample size needed for an analysis with a statistically reliable rating using SUMI is supposedly in the range of 10 – 12 users; however, evaluations have been carried out successfully with even smaller sample sizes.
A tested Dutch translation is available. Since SUMI was launched as a project partly sponsored by the European Commission, it entered a multi-linguistic environment almost from the first stages of its development using a variety of methods to neutralize bias and cultural differences among different languages.
Finally, SUMI is well established, acknowledged by ISO, and sponsored by the European Commission.

As stated earlier, there were doubts about the rather inflexible questionnaire-type-of-measurement that characterizes SUMI and many similar tests. While the statistical claims appear solid, the question remains if the formalized and standardized questions themselves would uncover the right usability issues under investigation. In response to this problem,
the SUMI method was enriched with some additional interviewing and recordings to find out more results in addition to the repeatable SUMI-part. I will elaborate on this at the end of the chapter.

5.2.6. Post-Task Walkthrough

To map the working processes during interaction (DV), it is possible to use the talk-aloud method (or: thinking-aloud protocol, Kuusela, 2000) where participants are asked to tell the researcher what they are doing and why. While this information can provide much insight, the method can however be quite intrusive to the interaction and would, in fact, render the time measurement useless. This method was therefore not used in the present study.

Because of the above-mentioned disadvantage of the talk-aloud method, we reviewed persons’ actions afterwards and asked them to explain them at that time. This is known as the post-task walkthrough (or as cognitive walkthrough, see Blackgamon et al., 2003) and requires the use of a recording technique. Although, due to a decrease in the immediacy of the response, some ‘freshness’ is lost, the method is frequently used to support design studies (Jeffries et al., 1991).

Figure 8: depicting traditional system during Experiment [II].

5.2.7. The Questionnaire

The complete version of the questionnaire can be found on the website of this dissertation www.geogov.org. It contains the required questions addressing the variables mentioned in table 3. A survey of this form is also kinder towards time-constrained participants and, moreover, the results could be immediately digitally collected. I chose to supply ordinal scales with an even number of options. Scales this size do not offer a neutral selection. This forces participants to make a choice, e.g. “somewhat negative” or “somewhat positive”. I developed classes 1-6 for experience: Ordinal values like level of knowledge of legal data could be rendered more discrete during the statistical analysis by categorizing them into classes such as: “inexperienced” and “experienced”. The values level of knowledge of legal data (CV₁₀), level of knowledge of geographical data (CV₁₁), and level of computer experience (CV₁₂) are self-assessed evaluations.
5.2.8. Participant Survey Procedure

The participants were first introduced to the context of the research. They were told they would be presented with information in two separate systems and that they would have to answer three questions using each system. The purpose of the video camera was explained, as was the fact that a post-talk walkthrough and a questionnaire would follow the practical part of the experiment.

After the participants finished the last condition, and before the post-task walkthrough, the time estimation questions were asked immediately so they would not be influenced by the viewing of the footage and the counter on the video camera. Finally, the questionnaire was administered in pen-and-paper format.

**Traditional System**

**Table 4. Traditional system use-case 1.**

<table>
<thead>
<tr>
<th>Title:</th>
<th>Establish what legal information/which norm is valid in a certain region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actors:</td>
<td>User, System</td>
</tr>
<tr>
<td>Entry condition:</td>
<td>All (static) information is available on screen or in print.</td>
</tr>
</tbody>
</table>

**Flow of events:**

**User**
- Select area on the map.
- Find the type of the region.
- Find analog legal texts that apply to this kind of region in general or this region in particular.
- Read and interpret legal text and (norm).

**System**

**Exit condition:** Data (norm) of interest has been found and extracted or marked.

**Exceptions:** No data could be found.

**Table 5. Traditional system use-case 2.**

<table>
<thead>
<tr>
<th>Title:</th>
<th>Establish in which region(s) certain legal data/a norm are/is valid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actors:</td>
<td>User, System</td>
</tr>
<tr>
<td>Entry condition:</td>
<td>All (static) information is available on screen or in print.</td>
</tr>
</tbody>
</table>

**Flow of events:**

**User**
- Browse the legal text.
- Find the regions described in relevant sections.
- Find out how these regions are represented on the map.
- Mark the regions where a norm is valid.

**System**

**Exit condition:** Data of interest have been found and extracted or marked.

**Exceptions:** No data could be found.
Digital System

Table 6. Digital system use-case 1.

<table>
<thead>
<tr>
<th>Title:</th>
<th>Establish what norm is valid in a certain region (query map to text)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actors:</td>
<td>User, System</td>
</tr>
<tr>
<td>Entry condition:</td>
<td>System is loaded and initiated.</td>
</tr>
<tr>
<td>Flow of events:</td>
<td></td>
</tr>
<tr>
<td>User</td>
<td>System</td>
</tr>
<tr>
<td>Select area on map by clicking the map.</td>
<td>Highlight the selected area on the map.</td>
</tr>
<tr>
<td>Select a section of interest.</td>
<td>Display the legal text about the norm.</td>
</tr>
<tr>
<td>Read the legal text about the norm.</td>
<td></td>
</tr>
<tr>
<td>Exit condition:</td>
<td>System displays legal information about a norm that is applicable for that area</td>
</tr>
<tr>
<td>Exceptions:</td>
<td>No data are available.</td>
</tr>
</tbody>
</table>

Table 7. Digital system use-case 2.

<table>
<thead>
<tr>
<th>Title:</th>
<th>Establish in which region(s) a certain norm is valid (query text to map)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actors:</td>
<td>User, System</td>
</tr>
<tr>
<td>Entry condition:</td>
<td>System is loaded and initiated</td>
</tr>
<tr>
<td>Flow of events:</td>
<td></td>
</tr>
<tr>
<td>User</td>
<td>System</td>
</tr>
<tr>
<td>Browse legal text.</td>
<td>Display the legal text.</td>
</tr>
<tr>
<td>Choose an option to display spatial data indicating (highlighting) a section of the area</td>
<td>Highlight applicable sections of areas on the map</td>
</tr>
<tr>
<td>View areas</td>
<td></td>
</tr>
<tr>
<td>Exit condition:</td>
<td>System displays legal information about an area by showing the highlighted section</td>
</tr>
<tr>
<td>Exceptions:</td>
<td>No data are available.</td>
</tr>
</tbody>
</table>

Each task scenario contains a mixture of questions for each search direction from map to text and from text to map (opportunity seeking) to achieve the following two goals:

1. Establish what norm is valid in a certain region
2. Establish in which region(s) a certain norm is valid.
5.3. Scenarios Introduction

In what follows, the scenarios are introduced. Each scenario contains a mixture of questions for each search direction from *map to text* and from *text to map* following the two goals: “Establish what legal information is valid in a certain region” and “Establish in which region(s) certain legal data is valid”. Since it was expected that the participants of this research would have an unequal grasp of the English language, but have commonly the Dutch nationality, it was decided to neutralize this variable by offering Dutch versions to the participants of this research. This research featured two scenarios. These scenarios, just like the order of conditions, were alternated between subjects. This means that any subject received a similar but different scenario when performing the second conditions so that to diminish any memory or learning effect.

5.3.1. Scenario 1

“The following questions apply to the spatial plan of the municipality of Drachten, the contents of which were presented to you in some form. Most answers can be limited to a simple “Yes” or “No”, but you may optionally provide a short explanation. If you are unable to answer the question, please put down a question mark (“?”) in the answer field. Here an explanation may also be applicable. Mistakes can be corrected by simply scratching them out. When you are asked to mark one or more locations on the map, please mark the applicable sections using the coloured marker. You can then correct incorrectly marked sections by completely marking them using the black marker. Good luck.”

*Figure 9: Task scenario 1.*

**Question 1**

An area is marked on the map.

⇒ According to the current spatial plan, is it permitted to place a children’s play slide here?

..................................................
..................................................
..................................................
..................................................

The answer should have been:

Yes, paragraph 7.1 bullet ‘c’ states that playing equipment is allowed here.
Question 2

A painting company is looking for a space for their administration office. Time is of essence, so there is no time to request an adaption or exception to the spatial plan (article 19 procedure).

⇒ Where in Drachten is it possible to open a department like this?

‘You may mark the applicable area(s) on the map below’ (see figure 10).

Question 3

Once a year, a traveling circus visits Drachten. The staff of this circus need space to put their (living) caravans.

⇒ In which location(s) does the current spatial plan of Drachten reserve space for this?

‘You may mark the applicable area(s) on the map below’ (see figure 10).

Figure 10: Map of spatial plan regions in Drachten.

“This concludes this scenario. Thank you.”

Figure 11: answer to question 3.

The answer should have been:

The answer to Scenario 1, question 3 about the circus should have been:
5.3.2. Scenario 2

“The following questions apply to the spatial plan of the municipality of Drachten, the contents of which were presented to you in a specific form. Most answers can be limited to a simple ‘Yes’ or ‘No’, but you may optionally provide a short explanation. If you are unable to answer the question, please put down a question mark (‘?’) in the answer field. Here, an explanation may also be applicable. Mistakes can be corrected by simply scratching them out”.

“Good luck”.

Figure 12: use case scenario 2.

Question 1

North of the water ring lies a piece of land.

Does the current spatial plan permit the construction of an office building here?

The answer should have been:

No, building is currently not permitted and the area is not destined to have office buildings (20.1).

Question 2

To improve the inflow of starters on the housing market, the government recommends defining at least 10 spatial surfaces for social housing.

Does the area in Drachten currently meet this requirement?

The answer should have been:

Yes, 11 regions are marked ‘Wonen-Sociaal’.
Question 3

The municipality would like to place a statue in the centre of this roundabout. The statue has a 1m² base and a height of 3.30 meters.

Is it necessary to adapt the spatial plan to permit this action?

..................................................................................
..................................................................................
..................................................................................
..................................................................................

Figure 13: question 2 and 3.

“This concludes this scenario.
Thank you.”

The answer should have been:

No, the maximum height for works of art in the ‘Verkeer-Verblijf’ region is 5 meters. The statue is beneath the limit and no surface limitations are mentioned.

Scenario Properties

The texts above were offered to the participants of this research. Both task scenarios state a clear objective and specifications that an area should abide to. The second question of Scenario 1 about the painting company’s administrative office allows for multiple answers of which some could be considered to be ‘more correct’ (accuracy) than others. In this regard, a distinction has been made between false, correct, and optimal answers. It features the selection of areas that, according to the spatial plan of Drachten, are directly suitable for setting up an administrative office for a painting company. A simple search would return the correct result of two areas defined as a ‘business park’
‘Bedrijventerrein’). However, since Chapter 1, section 42 of the spatial plan of Drachten defines an ‘office’ as ‘a building that by classification and interior design is apparently suited for administrative activities’, an optimal selection would include a third area designated for office space.

Therefore, the answer to this question could score 0% (incorrect), 66% (correct), or 100% (optimal) when all three areas are identified (see figure below).

The answer to Scenario 1, question 2 should have been:

Figure 14: Three options (correct and optimal) for ‘Office’, where the third is found faster only with the help of text-to-map.

The property of this answer may also incite users to use the function ‘Add to Selection’ incorporated into the proof of concept (see button shown on the right indicating: ‘add sports to the map’).

This observation (DV3) can be made by the researcher during the post-task walk-through. In light of the latter, the final question of Scenario 2 is easier to answer when the zoom function is used. Both task scenarios offer a great deal of text navigation and reading.
Measuring Time (Dependent Variable 1)

The question is which system enables the participants to produce the fastest results: the traditional (paper text documents) or the modern system (computer program). The bar graph in figure 15 presents a visual comparison between the mean times of all participants for each condition.

Figure 15: Comparison of mean response times between the two systems.

The visualization in Figure 14 does not allow for making any immediate conclusions on a longer duration of the use of one system over the other. We need to compare the two groups using statistical analysis. Before we know which statistical test is best suited for this purpose, we must check the distribution of our data. This was done by generating a P-P plot for the two time columns under each condition (see figures 16+17).

Figures 16+17: P-P plots for time for traditional system (left) and modern system (right).
As can be seen in figures 16+17, the data points for time follow a normal distribution. Thus, a parametric t-test can be applied on time variables. Parametric methods are usually more precise than non-parametric methods. However, they do require the property of an underlying normal distribution. We have continued to perform a statistical paired Sample t-test. The p-value of 0.897 obtained in the paired samples t-test (Gamble, 2001) that was performed further suggests that there are no significant differences between the recorded times in the two conditions. The application of a sign test (p-value = 0.887), Friedman test (p-value = 0.796) and Student’s t-test (p-value = 0.926) did not yield different results. These statistical tests were performed done before any grouping was defined. Grouping helps to take into account any distinctions related to the fact that it took the participants longer to complete the task because they acted out different scenarios under their condition or the fact that they began the experiment with different conditions. We will come back to the influence of the order in which the participants worked and the grouping later in the chapter.

Measuring Accuracy (Dependent Variable 2)

For measuring the accuracy figures, the respondents were asked to answer three questions in a scenario under each condition. One point per complete answer was assigned, enabling thus for a total of three possible points per scenario. Incomplete answers were also possible, hence the points ending with decimals .25 or .83 and so on. The tasks under each condition were also divided into two categories: (1) tasks that go in the direction from map to text and (2) tasks that go in the direction of text to map. Because the number for each type of task differs between scenarios, the variables for these subcategories of questions were converted into percentages. Figure 18 below presents the overall results for accuracy measured in points.

Figure 18: Accuracy between the two systems (incorrect, correct, optimal).

![Accuracy between the two systems](image)

Please note that there are no missing values. The apparent absence or zero height of a bar, as in the case of participant 12, represents that participant’s scoring no points. Here, the question arises: when people switch over to a software system and are tested again, do the test results improve? And is there a difference between the accuracy of the different
types of questions (i.e., between conditions)? Before we start any statistical tests for the different categories of accuracy, we first check to see if the data in these columns are normally distributed. Based on this outcome, we know which statistical tests to perform. The P-P plots (see figures 19-25) show that the figures gathered on accuracy more or less follow the line that represents normal distribution, although the amount of different data points is small in some plots. This can be explained by the fact that there was a limited amount of questions and, therefore, many participants arrived at the same number of points or percentages.

Figures 19-25: Normal P-P plots for accuracy.

Note: In order of reading: total accuracy for the traditional system, total accuracy for the modern system, map-to-text questions on the traditional system, map-to-text questions on the modern system, text-to-map questions on the traditional system, and text-to-map questions on the modern system.)
A paired samples t-test on the total accuracy for the traditional system versus the total accuracy for the modern system yielded the p-value of 0.573. Furthermore, a two-tailed Student’s t-test (two samples unequal variance) returned the p-value of 0.597. Therefore, it can be safely concluded that there is **no significant difference** between the accuracy between the two conditions. The results do not justify that the user is more accurate with the modern system.

However, I will look further into the matter of accuracy. As mentioned before, we have made a division between the tasks that go in the direction of *map-to-text* and questions that go in the direction of *text-to-map*. We have divided these two categories of questions into two groups of values. Now we can run the test to see if the result is different when we focus on a particular direction of the question.

**Figures 26+27: Mean accuracy of map-to-text and text-to-map questions (%)**.
When comparing the accuracy of map-to-text tasks done in the traditional system and that of map-to-text tasks done in the modern system, the p-value of 1.000 is returned by the paired samples t-test and Student’s t-test, which shows that there is no correlation. Subsequently, a potential difference between the questions that focus on navigation from articles of text to areas on the map for both systems was tested. Here, no significant difference is observed as well. A paired samples t-test returns the p-value of 0.756. A Student’s t-test returns the p-value of 0.781. Thus, it can be concluded that there are no differences in accuracy of similar-category questions between systems. If people are fit to answer questions going in one direction and not the other, switching from traditional systems to a software system does not change their accuracy in any way. In this context, one question remains.

Which type of tasks are our users better able to handle? As suggested in the two diagrams (see figures 26+27 on the previous page), many more gaps and lower scores seem to fall in the last category: the text-to-map type of tasks. Therefore, we compare the scores of these two types of questions within the used system. When comparing the two groups of questions within the same system condition, paired samples t-tests return p-values of 0.011 and 0.042 for the traditional and modern systems, respectively. In general, people seem to have a better grasp of map-to-text tasks. Questions that require tasks whereby searching in the opposite direction is necessary, are more difficult to answer.

5.3.3. Relevant Correlations

Level of Experience with Geographical Data & Accuracy, Learnability, Global

When the level of experience with geographical data is higher, measured variables show that accuracy is also higher. Accuracy on the traditional system in general increases (0.017). With the modern system, the accuracy of response to map-to-text questions specifically increases (0.003). Taken together, this results in a positive correlation between the level of experience with geographical data and the total accuracy (0.010). This is in line with earlier statements and findings on the learning effect with respect to geographic systems (McAll, Sheffield 2007). Further significant correlations were found between the level of experience with geographical data and the SUMI variables Learnability and Global.

In software testing, learnability is the capability of a software product to enable the user to learn how to use it. People who report a substantial experience with geographical data also more positively judge the software application, in general, and its learnability, in particular. The p-values for the correlation between this experience and the learnability and global score are 0.008 and 0.035, respectively. This suggests that people who are more experienced in using geographical data transfer to the new system more easily and more effectively.
Accuracy (Traditional System) & Control, Learnability, Global

Accuracy in the traditional system also appears to influence peoples’ view of the competing digital system. The Global SUMI scores increases ($p$-value $= 0.045$) and so do the subcategories Control ($p$-value $= 0.022$) and Learnability ($p$-value $= 0.049$). Furthermore, the accuracy of the map-to-text questions specifically influences efficiency, control, and global ($p$-values $0.080$, $0.086$ and $0.014$, respectively) suggesting that more competent users transfer more easily to the modern system.

Accuracy (Modern System) & Helpfulness, Learnability, Global

In light of the assumption in the previous paragraph, it appears that a higher accuracy greatly influences people’s view of the program. The more accurate people are able to answer the questions – and we assume people somehow have some confidence in the correctness of the answers they have given – the higher the modern system is rated. In this case, the global value of the SUMI questionnaire correlates with the accuracy ($p$-value $= 0.094$) and the subcategories for Helpfulness and Learnability ($p$-values $0.099$ and $0.044$, respectively). The map-to-text questions were largely responsible for this outcome. The accuracy of map-to-text questions using the program are positively correlated with the SUMI variables for Helpfulness ($0.098$), Learnability ($0.026$) and the Global ($0.020$). There are several possibilities to interpret this outcome. The more competent person in planning can adapt more easily because s/he understands the domain better; thus, for him the system is more intuitive and inherently usable – he adapts better and so finds the system more easily usable. Furthermore, it could also be that when people feel they have found the answer to the questions that were asked using the modern system, they rate a number of factors related to the software’s usability higher.

Within SUMI

Almost all variables within the SUMI questionnaire are correlated. This is a good sign, because this is the way the test is constructed. It shows that there was no irregular user feedback.

5.3.4. Other Correlations

Time & Accuracy

Speed & accuracy are uncorrelated. An assumption would be that people who spend much time working on a scenario and condition would deliver more accurate answers than those who browse through the information relatively quickly. Apparently, this is not the case. It suggests a lower level of competence is the driver of lower scores.
Time & Efficiency

We expected that the faster people were able to solve the scenario using the computer program, the higher the correlation on the scale of efficiency in Sumi would become. However, this was not the case. There was also no significant difference between the times for the traditional and modern systems.

Time (Traditional System) & Time (Modern System)

If people were quick in the traditional system, they were also quick in the modern system and vice versa. The $p$-value of 0.054 was found here, which supports the idea of an easy transfer by more expert participants.

Time (Traditional System) & Accuracy for text-to-map questions (Modern System)

The measured time for working on paper is positively correlated to the accuracy of text-to-map questions answered using the computer program ($p$-value = 0.093). It appears that the longer people work on the traditional system, the more accurate they are in answering text-to-map questions using the computer program. Other experts commented that these participants were probably very familiar with the planning process as a whole and, therefore, were more prepared to use the modern version for the task.

5.4. The SUMI questionnaire outcome

Below you can find a part of the questions as an illustration of the SUMI test used.

<table>
<thead>
<tr>
<th>Question</th>
<th>agree</th>
<th>no option</th>
<th>disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>This computer program responds too slowly to input by the user.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would recommend the usage of this computer program to my colleagues.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The user is helped by instructions and by signs that user input is expected (prompt).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At some time, the computer program stopped unexpectedly.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the beginning, learning to work with the computer program causes many problems.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With this computer program I often have no idea what to do next.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I like working with this computer program.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The messages of this computer program are not very helpful.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 7 below presents descriptive statistics for the SUMI-questionnaire. Among other values, it contains the median as the representative average, the 95% confidence intervals around the median, and the maximum and minimum scores for each category. The results in Table 7 concern only the modern system.

**Table 7: Descriptive statistics for SUMI variables against the reference (state of the art) database of 50.**

<table>
<thead>
<tr>
<th></th>
<th>Score against the reference database of 50</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Efficiency</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>47.60</td>
<td>3.315</td>
</tr>
<tr>
<td>95% CI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Bound</td>
<td>40.49</td>
<td></td>
</tr>
<tr>
<td>Upper Bound</td>
<td>54.71</td>
<td></td>
</tr>
<tr>
<td>5% Trimmed Mean</td>
<td>47.67</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>47.00</td>
<td></td>
</tr>
<tr>
<td>Variance</td>
<td>164.829</td>
<td></td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>12.839</td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Interquartile Range</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.214</td>
<td>-0.580</td>
</tr>
<tr>
<td><strong>Affect</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>51.00</td>
<td>3.460</td>
</tr>
<tr>
<td>95% CI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Bound</td>
<td>43.58</td>
<td></td>
</tr>
<tr>
<td>Upper Bound</td>
<td>58.42</td>
<td></td>
</tr>
<tr>
<td>5% Trimmed Mean</td>
<td>51.11</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>53.00</td>
<td></td>
</tr>
<tr>
<td>Variance</td>
<td>179.571</td>
<td></td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>13.400</td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.012</td>
<td>-0.580</td>
</tr>
</tbody>
</table>

The sense of the degree to which the software enables the task to be completed in a timely, effective and economical fashion.

The respondents emotional feelings towards the software (e.g., warm, happy).
### Helpfulness

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>95% Confidence Interval for Mean</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>The perception</td>
<td>41.80</td>
<td>Lower Bound</td>
<td>34.55</td>
<td>49.05</td>
</tr>
<tr>
<td>that the software communicates in a helpful way to assist in the resolution of difficulties.</td>
<td></td>
<td>Upper Bound</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5% Trimmed Mean</td>
<td></td>
<td>41.56</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td></td>
<td>41.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Variance</td>
<td></td>
<td>171,600</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td></td>
<td>13,100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
<td></td>
<td>26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td></td>
<td>62</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td></td>
<td>36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skewness</td>
<td></td>
<td>-0.392</td>
<td>-0.580</td>
</tr>
</tbody>
</table>

### Control

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>95% Confidence Interval for Mean</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>The feeling</td>
<td>50.60</td>
<td>Lower Bound</td>
<td>45.38</td>
<td>55.82</td>
</tr>
<tr>
<td>that the software responds to user inputs in a consistent way and that its workings can easily be internalized.</td>
<td></td>
<td>Upper Bound</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5% Trimmed Mean</td>
<td></td>
<td>50.67</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td></td>
<td>47.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Variance</td>
<td></td>
<td>88,971</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td></td>
<td>9,432</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
<td></td>
<td>35</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td></td>
<td>65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skewness</td>
<td></td>
<td>-1.137</td>
<td>-1.580</td>
</tr>
</tbody>
</table>

### Learnability

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>95% Confidence Interval for Mean</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>The feeling that it is relatively straightforward to become familiar with the software.</td>
<td>48.20</td>
<td>Lower Bound</td>
<td>43.59</td>
<td>52.81</td>
</tr>
<tr>
<td></td>
<td>5% Trimmed Mean</td>
<td></td>
<td>48.67</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td></td>
<td>50.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Variance</td>
<td></td>
<td>69,171</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td></td>
<td>8,317</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
<td></td>
<td>29</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td></td>
<td>59</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skewness</td>
<td></td>
<td>-0.921</td>
<td>-0.580</td>
</tr>
</tbody>
</table>

---

The category with the lowest scoring average is Helpfulness. This outcome was to be expected since the experimental application had no built-in help other than a short welcome text and minor tool tips when the mouse was hovered over specific buttons. 'Affect' and 'Control' scored highest.

5.5 Measuring preference and other results of the additional questionnaire

An important question is whether or not the added affordance of Legal Atlas to navigate from text documents to map regions is beneficial in our participants’ jobs. One of the ways to get an answer to this question is simply asking for this information in a questionnaire. The participants were asked to agree or disagree with the statement “I can use the affordance ‘Display on map’ in my occupation.” The question was returned later as a statement in the negative form. This allowed for checking whether the question was understood and ensured that it was not answered in an ambiguous manner.

After performing a simple sign test on the values for the two questions, the p-value of 1,000 was returned. This makes it possible to conclude that there is no difference between the two groups of variables. In fact, such a high p-value indicates that every participant has consistently answered both questions. None of them has sued in a different form. Thus, the answers to this question were overwhelmingly positive.

All participants see a practical application for such a text-to-map affordance in the context of their work. One of the participants mentioned that it could help in locating legal references more quickly.

See appendix for complete SUMI questionnaire.
<table>
<thead>
<tr>
<th>Overall usability</th>
<th>Mean</th>
<th>47.00</th>
<th>3.357</th>
</tr>
</thead>
<tbody>
<tr>
<td>95% Confidence Interval for Mean Lower Bound</td>
<td>39.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Bound</td>
<td>54.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5% Trimmed Mean</td>
<td>47.72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>46.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variance</td>
<td>169,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>13,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.491</td>
<td>0.580</td>
<td></td>
</tr>
</tbody>
</table>

The category with the lowest scoring average is Helpfulness. This outcome was to be expected since the experimental application had no built-in help other than a short welcome text and minor tool tips when the mouse was hovered over specific buttons. ‘Affect’ and ‘Control’ scored highest.

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After performing a simple sign test on the values for the two questions, the \( p \)-value of 1,000 was returned. This makes it possible to conclude that there is no difference between the two groups of variables. In fact, such a high \( p \)-value indicates that every participant has consistently answered both questions. None of them has sued in a different form.

Thus, the answers to this question were overwhelmingly positive. All participants see a practical application for such a text-to-map affordance in the context of their work. One of the

---

109 See appendix for complete SUMI questionnaire.
participants noted his worry that a lack of factual information in the legislation will not allow for some of these functionalities of such a system, as there are no ambiguous definitions. Similar observations were made earlier in this chapter about imperfect mapping and semantics. Not a single individual in our sample has indicated map navigation as troublesome. Everybody indicated that they could use the function ‘Display on map’ in their occupational tasks and every individual in our sample could foresee other uses for the program besides working with a spatial plan, as was the case during the experiment.

Figure 28: Use for ‘Display on map’ in a job.

**Figure 28 A**

Use for ‘Display on map’ in job
- Yes
- No

**Figure 28 B+C**

Use for ‘Display on map’ in occupation
- Yes
- No

‘Display on map’ can have other uses
- Yes
- No

**Figure 28 D+E**

Text navigation is easy
- Yes
- No

Map is better viewable on screen
- Yes
- No
The majority of the participants indicated a preference for reading on paper. This suggests that tasks that only require reading – e.g. no searching or comparison - should be still be facilitated through paper. The majority of the participants indicated a preference for displaying a map with legal constraints on the screen. Even though the resolution and size of computer monitors are limited and the maps in question are quite large, it appears that the ability to pan and zoom can help resolve these issues.

Although many participants noted that the computer program better assists in answering map-to-text questions, vice versa this is not the case. There is no evidence of people stating that it is easier using the computer program for text-to-map tasks when compared to using a paper version for finding an area where a certain rule applies. This question as part of the extended SUMI questionnaire does not provide the same answers as the qualitative interviews.

The respondents was also asked if the digital system would help getting an end-result in the context of their work. They answered that a traditional system is actually slower:
One of the final questions of the questionnaire was a simple direct request for people to indicate which system they preferred in general. This resulted in a major lean towards a computer program. Only one out of fifteen participants indicated a preference towards paper documents (see figure 31). The rest of the respondents preferred the digital system.

Figure 29: Overall system preference.

5.6. Post-experiment walkthrough analyses (DV3)

Search Methods

I was very interested to see which path people follow to reach their goal during the experiment. Much of this information was recorded in the post-task walkthrough videos. In what follows, the quotations are accompanied by a number and letter referring to each subject’s identification number and a note if the source can be found in the questionnaire (Q) or post-task walkthrough recordings (W). Transcripts of the recordings will be made available on www.geogov.org, because the appendix would be too sizable otherwise. The highlights will be presented below.

Map-to-Text

While observing people trying to find information using Legal Atlas, it was observed that the map-to-text entrance was found reasonably fast. Thus, clicking the map is one of the first things people do. The prominent top left location of the map and similarity with the current working methods of the participants might invite this behavior. After clicking an area on the map, most people see the keyword and navigate to an article the following way: “It was immediately clear I had to click that area. I clicked and then saw it had ‘Green’ as a designation. I got the provisions to see if a slide was permitted. Playing equipment was permitted, so the answer is yes. That was not difficult.” [6W]. Furthermore, participant 10 mentioned: “It was really easy to click the area. I could immediately see which function it was. I didn’t have to look up
which colors corresponded to which functions.” [10W]. Yet another respondent explained: “First I was a little afraid: how does this program work? But, after one click on the map, its simplicity became immediately clear. [...] When you click a location on the map, you immediately get the provisions on the screen. At least you get the title and then you can look up the provisions for it. I was pleasantly surprised because the program functioned in a quick and organized way. The fear that it would be difficult disappeared.” [14W].

Some people failed to notice any change of state after their input on the map: “I click the area on the map to see if information pops up. [...] I could not immediately assess whether this happened or not. [...] You expect to get a regulation at the moment you click. This was not entirely clear. Some text appeared on the screen underneath. There was no real pop-up or something to draw your attention. That means you have to start searching on the screen. In the end, I found it by clicking in the tree structure. There I noticed the link to the text. That did not happen while I was clicking on the map.” [3W]. Participant 8 added: “The first thing you do is see if you can find the position of the area on the screen. [...] Intuitively, you think: where can I click this thing? This is possible with the three options you have. The next question is: what happens on your screen? And I did not immediately notice which sub-screen responded to the mouse click.” [8W].

However, a number of people did not click the title of the article, but instead used it to look up the item in the tree with the same name. The fact that the title/keyword was a link was not always discovered. Only one of the fifteen participants (participant 12) completely failed to find a way to navigate from map to text: “The question was clear. But I expected I would have a square to click and then I would see the provisions that apply there. But that didn’t work. Furthermore, I couldn’t find a legend on the screen. Because with that, I would be able to see: ‘Ah, those are these designations and would have been able to quickly look them up’.” [12W]. This participant later returned to the map-to-text questions using the function ‘Display on map’ because he found the other approach.

This said, the functionality that leads from map to text was overall clear to the participants. As stated in the previous chapter, the map-to-text questions are overall answered more accurately. The statements by our participants show that indeed they considered the map-to-text questions to be easier. As participant 3 notes: “This is a clearly marked area of which the information should be easy to retrieve. It is not a question such as ‘give me all the locations of X’ on a map but give me information about this location. [...] This question refers to a specific location. These are always easier.” [3W]

The method that was used mostly included the following steps:

1. Matching the indicated map on the scenario sheet with the one on the map.
2. Clicking the map.
3. Clicking the title of the article or, in some cases, clicking the same title in the tree.
4. Reading the article, often skipping to the appropriate heading based on prior knowledge. Only one out of fifteen participants did not use this method to find information about a specific area on the map.
Text to Map

The text-to-map direction was considered more difficult sometimes. People do notice the difference between the two directions and understand that these are two different approaches: “Questioning is different here: we have got something to do and we are looking for a space to do it.” [5W]. Participant 3 specifies: “Here I tried in some way to go from text, assuming you have a company description. To enter from a company description and, based on this, select the areas on the map. That didn’t go entirely smoothly. At some moments I had two areas coming up. That led me to conclude that I at least had a complete result, that there weren’t any more.” The participant continued to repeatedly use the function ‘Display on map’: “Through the map entrance, you’re not going to find anything anyway.” [3W]. Participant 7 also experienced no difficulties in using the reverse function: “... if you are in an article, you see a way to ‘Display it on the map’.” [7W]. More respondents stated they had little problem with finding their way: “For question 3, I once again looked up the possible provisions appropriate for this in the tree.

By clicking the spatial description I looked up the same way of highlighting the regions on the map again.” [11W]. Furthermore, participant 14 notes: “This was very handy because you click the text and subsequently you could highlight the areas. This way you definitely search much faster than from paper [...] no problem.” [14W]. Participant 15 adds: “From ‘Uses’ I activated ‘Show on map’. Then I got there, that was my first step.” [15W]. The function to navigate from articles to regions on the map was present on top of each article. Unlike with the map-to-text function, it had its own label describing what it does. However, some of the participants did not find this function. For example, participant 6 mentions that: “[the case of the administration office] was difficult because I didn’t manage to light everything up by clicking on ‘Offices’. So I started to randomly click areas on the map. I did click the ‘Offices’ folder in the tree, but I didn’t see areas light up on the map, something I did expect to happen.” The respondent continued with repeatedly clicking the areas on the map: “I started to click on a lot of areas because I couldn’t find the reverse function.” [6W]. As mentioned above, the function ‘Display on map’ can only be activated from within a legal text article. Therefore, before highlighting any areas on the map, participants must have made a choice in selecting a legal text article which they thought described the areas that fit the one requested in the scenario. As a first step, the articles were selected from the file-tree based on the title of the text article. A number of legal text articles were skipped because they were clearly not relevant for the description from the scenario, e.g.: “I can make a rough estimate. If it’s about an office, than that doesn’t belong in a housing zone, that’s obvious.” [12W]. Text articles that were potentially correct were then read, after which the function ‘Display on map’ was activated. The highlighted areas were marked on the answer sheet and the respondent would continue with the next article. The original order from top to bottom was mostly followed. With the previous selection still highlighted, the participants could have used the second option under ‘Display on map’ to add the new areas to the selection. In the end, all areas would have been highlighted on the screen and could subsequently be marked on the answer sheet all at once. However, not a single user made use of this feature. People appeared to work one step at a time in building the result set for text-to-map questions.
5.6.1. Paper thinking methods based on paper processes

One of the participants indicated that indeed the ‘one step/one article at a time’ approach was taken: “My thinking processes are still ‘paper thinking’ processes.” [10W]. He also noted that the way the application worked matched this thinking method quite well: “For the majority of users who work with spatial plans, it is better to connect to the paper working methods. Then, this system is fitting.” [10W]. On the other hand, additional functionalities offering benefits over the traditional system, such as adding results to a selection, could be learned: “[...] those are conveniences that should be included and you should tell people about.” [10W]. Another participant remarked: “I think you are so programmed to work with spatial plans that you quickly fall back to the index. That’s the way I think. You don’t suddenly start clicking everywhere. Although it’s handy of course and I suppose I would do it if I worked with this type of system more often. Especially at first I think you very much work regarding it as a booklet. [...] You fall back into your old habits.” [13W].

User remarks about usage in their work

As shown by the statistical analysis, none of the participants from our sample responded negatively when asked whether or not the added value of the Legal Atlas affordance, to navigate from text to map, could be beneficial within the context of their occupation. The respondents were also asked to write down examples. They also came up with general examples where map navigation was used in their job. The paragraph below summarizes some interesting responses on this issue.

“[The] computer program offers essentially good usage opportunities, because, from text, map objects can be presented.” [3Q]. To the question if a (map-to-text type) task like this occurred a lot in practice, participant 7 responded: “Yes, a lot. These are the most basic questions I get when working with spatial plans. And if it’s about a certain location, you’d like to know where it is exactly.” [7W]. This respondent stated in the survey that it was most important to go from a map image to text. He did foresee a possible role for going from text to map under the condition that some kind of search function was implemented:

“[...] after which you could click on the search terms to go to the map.” Right now an entrance via text would not have my first priority.” [7W]. An environmental enforcement coordinator (participant 9) described another map-to-text application: “I am a project leader of the project ‘Buiten Beter’ (Better Outdoors) where I place calls using maps about environmental offenders. So [...] you’ve got the topographical map and, through a built-in GPS, the coordinates are established. Subsequently, I’m able to look up cadastral information for the location where the environmental offence has taken place. I can choose among 200 offenses across the four color tracks: spatial planning, environmental protection, environmental law and – blue – water laws. I can display offences according to themes. I can see who’s authorized to take action. [...] I like smart maps in that they already offer some information. Some stuff you could already know. Recently, they’ve been experimenting at the TU Delft with a new system that – when you arrive at a location – your PDA or computer informs you: at this location an environmental permit has..."
been given out, a building permit has been given out etc.” [9W]. This respondent concurred with the statement that his work primarily involved going from one point or location to information (the map-to-text feature). In the questionnaire, he noted that ‘going from a point on the *map-to-text* occurs more often’ in his job. He did note that the text-to-map functionality could speed up some tasks: “What was showed later on: the function of display all terrains that have this function. This means you can work faster.” [9W]. As an example, he described the preparation of the so-called ‘aspectcontroles’ (translates as aspect inspections) which are aimed at certain geographic areas and for which certain types of businesses that have environmental impact must be visited and checked.

A manager at a municipality department (participant 10) where spatial development took place also indicated that the majority of searches involved going from *map to text*: “Usually the question is very concrete about one certain case: I want to do this and that. Is that allowed? […] Building applications are very concrete. These are the most common. About 2000. Then we have people asking for spatial plan information: can I do this... there? About 800 a year. And perhaps 600 are bound to a specific area. Leaves about 200 of ‘I've got something, where can I do this?’ Those can be very special, such as the provision of heroine or providing shelter for addicts. Then you start searching [...] it would be an added value for service providing. [...] It's an important niche. If the owner of a business says ‘I want to establish my business in Tilburg with a hundred employees’, you’d gladly say yes. They always want a fast answer and quick decision. Within a week, you should provide an answer including the available areas of possibilities and protocols and procedures.” [10W].

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An employee in the same department concurred. To the question on whether the possibility to go from text to map had added value, he responded: “Yes, absolutely. During my occupation I regularly get an exception such as ‘I would like realize this and that. Which locations account for it?’ In that sense, the system complies very well. But the percentage of text-to-map questions in relation to the total number of request wasn’t very high: “Those aren’t too many. Most questions are about a cadastral lot that is already being worked on, or one that they already own. [...] Or that a certain location has already been chosen.” It would also be functional to display “Which permits have been given out within a spatial designation within a certain period of time.”. An engineering manager at a municipality mentioned that a map is important because using this feature makes it easy to share which geographical object you are talking about: “Sometimes you get a request: I have this address, what is allowed there? And there is the danger that the building is on a corner and he means both sides. That’s why we like a map: what part do you mean? Can you point at it on the map? That’s why maps are very important in our work.” [12W]. On the occurrence of the text-to-map direction, the same participant remarked: “Yes, it does occur. Like I saw here, where can I establish a business? Then it would be handy to highlight areas on the map. If you already know which zoning designations it falls into and so on. Those questions do occur. Mostly they are not covered by our department, because we usually deal with testing concrete plans. But Economic Affairs do have these requests. [...] You need both [directions].” [12W]. As concerns the occurrence of the text-to-map questions, a policy advisor for the chamber of commerce noted: “I do get requests like these, but mostly I evaluate spatial plans. I look at the opportunities for businesses. [...] I do a lot of responding on the spatial plan, judging how much space there is available for businesses. [...] Right now I usually have a paper version of the spatial plan from the municipality website in PDF format. In the end, that requires quite a lot of scrolling. You need to browse it all.” [13W]. This participant could think of a number of examples requiring a search in the text-to-map direction so that to provide information services such as: “Where is horeca (hotel and catering industry) allowed? Where is large/scale retail allowed? Visualize environmental categories on the map.” [13Q].

To the question whether or not test-to-map questions occur in his occupation, a broker specializing in recreational businesses responded: “Yes, definitely.” [14W]. However, he did comment that he thought the latter was more found at research agencies than brokers: “Brokers either have to buy or sell a location, a specific one. Or they must provide taxation about property value and the potential of the area. We are much more directed at locations. I can imagine that consultancy firms - that get questions from clients saying I would like to start something somewhere - deal with the latter question more often. [...] It’s not that we never get this [type of] question but we do get it to a lesser extent.” [14W]. In the questionnaire, he indicated that he would like to “check the usage as was entered at the data store from the tax office” and “visualize a region’s potential.” [14Q], another broker had a similar viewpoint: “... it’s usually aimed at a certain location. You should be able to know which cadastral lots belong to this firm and what is possible there, from the company’s name. That means you usually reason into one direction. [...] By chance, I’m currently working for a client who wants to start something in Germany. With one push of the button, I would have been able to see where opportunities lie. Only it just doesn’t work like that. Searching where something is allowed is usually coupled
with the prices attached to it. [...] Usually there are many criteria to assemble before you can start searching. It’s almost always about a specific location. In large municipalities, it sometimes happens that you want to compare different parts of a city to negotiate with the municipality on behalf of the owner as in: Could more opportunities be created?” [15W]. “If we’re contacted, a business needs to be evaluated, sold or extended (if something different can be done that is done now), so we look at the limits of the spatial plan. [...] If there is a way to work from a map image, that’s [faster]. From a cadastral point of view, you can’t see which lots an owner owns. You have to go from the lot to see who the owner is. From an owner, you would like to see on a map what their locations are. [...] Sometimes we do wish to put different layers (e.g. spatial, regional, and environmental) over the map for a location.” To summarize, this person said that one of the most important examples in the text-to-map direction consisted of “[…] finding lots with the same or similar spatial designation (in proximity) or finding cadastral lots with the same owner.” [15Q].

5.7. Conclusions on the structured user test

Experiment [II] aimed to give answers to two research questions, namely: Would a digital map-based system be preferred by the users over a traditional paper-based retrieval system? Would the text-to-map functionality be seen as an increased service value to the actors. In the first section of this Chapter, I set out with the hypothesis (H₁) that professionals who deal with a combination of geographical and legal data are better able to solve a legal issue featuring a spatial factor using a digital GIS than they are when using traditional methods. The qualification ‘better’ had been defined here in different ways, specifically:

1. Faster (as represented by the measured times)
2. More accurate (as represented by the number of points scored)
3. Giving more appropriate functionality, working pleasure, confidence, or feeling of control to the user (as represented by indicated preference)

With regard to the time for different systems, the results suggest no significant difference between the two conditions. Therefore, the null hypothesis has to be accepted. Participants do not work significantly faster using the software program. Accuracy (Measuring Accuracy, p. 31) between the two conditions based on a p-value of 0.573 we must also reject our H₁. This means that there is no indication that the users are faster or more accurate with the digital system than with the traditional system. It also means that no support has been found for digital technology improving tasks at this stage. There was also no evidence of a lesser performance, however.

Focusing on the particular search directions, map-to-text vs. text-to-map, it also has to be noted that no significant difference between groups was observed (p-values: 1.000 & 0.756). The participants did not give more correct answers when working with the computer
program, nor is a single category of questions significantly more solvable using either system. With regard to the indicated preference, the modern digital system ‘wins’ with a landslide (1:14).

The participants have considerably greater difficulty in dealing with the text-to-map type of tasks. When studying the differences between the accuracy of the two categories of questions within conditions, the results of the statistical tests $p$-values of 0.011 and 0.042 tell us that $\mu_1 > \mu_2$. Although the current version of the computer program does not yet support individuals well enough to generate more accurate answers for this category of questions and tasks, this latest conclusion does show that there are opportunities here to add value to and improve peoples’ search activities in this area. As shown in the remarks to the questionnaire and in quotations from the post-task walkthrough, the participants have repeatedly indicated a great willingness to learn to use the information system as well. The level of acceptance appears to be quite high.

People have less difficulty in the map-to-text type of questions. Navigating and clicking the map poses no real problems. After selecting the areas on the map which they are interested in, these people are subsequently able to navigate further to the text in which the relevant information is looked up the same way as it is conventionally done when using paper. This is done by simply browsing through it, sometimes skipping to the appropriate heading based on experience.

When observing text-to-map questions, the work process gets somewhat more complicated, as the participants are forced to select provisions of law that potentially describe what is asked in the scenario. This means the participants will make choices to exclude some obviously inappropriate provisions based on the title. The remaining legal articles are subsequently navigated in a fixed way, top to bottom. For each item, the participants will be browsing the text – or navigate to a specific heading – to find whether or not this provision satisfies the specifications given by the scenario. If the conditions are met, then the function ‘Display on map’ is enabled, the areas are marked on the answer sheet, and the next item in the tree is visited. In this context, the ability to ‘add regions to the selection’ is never used. Participants have stated that a step-by-step method representing a paper thinking process is used similarly in a modern setting.

5.7.1. Occurrence of Text-to-Map searches in working situations

The cases that benefit from searching from text to map are clearly present, but do form a minority. However, since they do occur and as most methods are oriented towards the map-to-text approach, such cases are considered to be more challenging. The statistical analysis on accuracy (see section p. 31) also supports the observation that people are less equipped to handle this inverse search direction from text to map.
When asked for their perception of the future potential value of the proof-of-principle application, the participants provided the following answers (see figure 30).

Figure 30: ranking of potential of affordances as seen by respondents.

I can derive that more experienced /able subjects transfer from paper to computer more easily and report higher levels of usability. By contrast, less experienced/ able subjects transfer less easily and are more likely to blame the system/report lower usability.

The participants were also asked to rank five potential affordances representing various functions within GIS design in order of their importance. These affordances consist of:

- Simulate the effect or impact of a law or regulation (Legal Constraints Simulator).
- Compare law X against law Y on a map (Legal Comparison).
- Find objects or regions where law X applies (Legal Atlas).
- Find a location where more opportunities for an activity exist through a combination of laws and context (Case Assessment, Legal Planning Opportunities).
- Using a calculation method to determine the increased or decreased permission space after a potential policy change (Legal Planning).
The bar graph above clearly shows that Legal Planning Opportunities and the additional proof of the text-to-map principle (Legal Atlas) affordances are ranked the highest of potential technologies. This promising outcome for the relation between technology and legitimacy will feed the next Experiment [III].

Overall, the results seem to indicate a contradiction between the preferences as indicated by the users and the measurable results in terms of time and accuracy. The preference and the results from the interviews are positive. The speed and accuracy of tasks with the help of the technology are not improved. The speed and accuracy did not decrease either.

5.8. Critical reflection

It was a challenge to capture the key elements of the advantage of maps over text in the experiments. The questionnaires and technologies applied at the time were not yet developed and disparate enough to identify attributes like “comparison capability of legal effect”. This action possibility is difficult to prove by means of paper questionnaires, since users seem to leap from text-based to map-based applications without consciously realising the considerable change in the use of interface attributes they just made. Mcgregener provides some theoretical insight for this conceptual difficulty: “The term affordance indicates exactly that implicit ‘leap’ from explicit instructions required by one design to intuitive usage afforded by the other. A kid does not need instruction to see that a ‘ball’ can be kicked and ‘cube’ cannot. The key is in the term “perceptual information”. Map-invited actions like “zooming in” or “instant comparison” or seeking opportunities “nearby” that text would not have suggested from its obvious purpose of use. This is mentioned here to clarify the methodological difficulties with the discovery of more fundamental affordances of the mapping concept versus the concept of text.

One of the methodological questions is whether ‘the possibility of aggregation’ and ‘a map-based approach’ variables are mixed and whether the preference for maps is not entirely based on a preference of aggregation. What we know from the theoretical step above is that the aggregation of objects in the model cannot be separated from the view side. Therefore, it can be assumed that bringing together aggregated amounts of textual hits without the ability to view them in relation to an overview of locations would not have generated a positive preference. The interviewees expressed a complexity of municipality permit processing differences, municipality differences in allowances (e.g., difference in closing time of recreational events), and other aspects related to the variable ‘location’ that would have made textual browsing and comparative analyses of alternatives without a location overview hardly ever possible.

Furthermore, it is also plausible to argue that the map aspects of ‘adjacency’ and
‘colouring’ support tasks in the ways that text cannot, as suggested by other protagonists of GIS and maps (Sheffield, McCall, 2002). This relation has not been explicitly investigated in the experiment. I have neither tested the relation between the variable ‘aggregation’ and the preference separate from the variable ‘map-based view’ nor the relation (or preference) between colourings in maps and improved accuracy. One could envisage an experiment with aggregated texts of all relevant locations and queries that provided textual returns with relevant legal sources and compare the preference with the same experiment using maps. In the present study, no such an experiment was arranged, so this is a possibility further research.

Another reason for a difference in concrete results during Experiment II and the perception of the value of the proof-of-principle is that the participants envision a task-load were the computing power is relevant. It can be argued that a digital system is faster, for example, when a thousand pages of legal sources have to be processed. It can also be argued that a digital system is faster when a search for a business activity implies many different facets, such as, for example, sound, pollution, time constraints, economic constraints and in a neighbourhood of a railway station.

It is clear that the respondents envision efficiency gain from the answers 15W and 15Q, those answers were most probably given while having in mind the production of many tasks each day. My purpose in the design of the test was to eliminate the ‘efficiency’ in performance gained by digital systems, but some respondents were already aware of this potential and future research could include this option in the testing methods.

There is also some indication that the difference between perception and measurements can be explained by the required learning required. The interviewees indicated a ‘paper way of thinking’ and ‘falling into old habits’.

From the correlation analyses, it can be concluded that more experienced/able participants transfer from paper to computer more easily and report higher levels of usability. By contrast, less experienced/able subjects transfer less easily and are more likely to blame the system/report lower usability.

This notion of the relevance of is supported by the findings of Dave Thijssen (2008) who performed a number of statistical tests on the data trying to determine the value of the SUMI method for this type of research on affordances with geographical information systems. Thijsen (2008) included an independent sample t-test taking the variable “working order” into account.

**Tables 8-9** summarize the results of independent samples t-tests for the different subcategories and total accuracy between the two systems. Grouping according to ‘begins’ (two groups consisting of participants who started out with different systems/conditions) and ‘order’ (same scenarios in different orders) are taken into account. Table 8 summarizes the outcome of the multiple independent sample t-tests. These tests were performed comparing the different categories of questions and taking grouping into account, acknowledging the
differences in scenarios/order and the systems participants started with.

Table 8. Summary of independent samples t-test.

| Grouping on ‘Begins’ |  
|----------------------|------|
| Begins 1 (T) versus 2 (M) |  
| Accuracy T | 0.388  
| Accuracy M | 0.960  
| Accuracy map to text questions T | 0.363  
| Accuracy map to text questions M | 0.915  
| Accuracy text to map questions T | 0.074*  
| Accuracy text to map questions M | 0.108  

Table 9. Summary of independent samples t-test.

| Grouping on ‘Order’ |  
|---------------------|------|
| Order 1 (T1M2) versus 4 (M2T1) |  
| Total accuracy T | 0.930  
| Total accuracy M | 0.591  
| Accuracy map to text questions T | 0.272  
| Accuracy map to text questions M | 0.789  
| Accuracy text to map questions T | 0.625  
| Accuracy text to map questions M | 0.219  
| Order 2 (T2M1) versus 3 (M1T2) |  
| Accuracy T | 0.134  
| Accuracy M | 0.595  
| Accuracy map to text questions T | The standard deviations of both groups are 0.  
| Accuracy map to text questions M |  
| Accuracy text to map questions T | 0.134  
| Accuracy text to map questions M | 0.512  

A significant p-value remains (0.074)* for the accuracy of text-to-map questions on the traditional system between the groups of people that started out with different systems.

It appears that the participants who started out with the computer program were better able to accurately answer the text-to-map questions using the traditional system afterwards. Thus, there emerges a learning effect. This learning effect is not observed in the other case, however: people who start with the traditional system are not better able to accurately answer (any type of) questions using the modern system later on. This suggests that performance is primarily determined by previous experience and knowledge.

“Somehow, there seems to be a learning effect present here. Through the use of the computer program, people are prepared and gain more understanding for the inverse search direction going from text to map. This relation is not present the other way around. People who work with the documents first and later switch over to the computer program do not score significantly higher in terms of accuracy on the modern system”. In summary, it seems that the prototype used in this
research is not better than a traditional system in terms of speed or accuracy, but people do seem to prefer software, they are willing to learn how to use it, and it does show the potential to support text to map type searches, which is a search direction that causes people significantly more difficulty than map-to-text searches”. (Thijssen, 2008, p. x).

At least three respondents gave an explicit statement about the learning-effect or the problems with the unfamiliar user-interface under the ‘other remarks’ field in the interview form:

“Method 1 is more familiar. Method 2 works faster and has more possibilities, it can be learned.” (Q2).

“The computer program does offer good and relevant functionalities, especially because of the fact that from text-search an object range can be retrieved (text-to-map). The look-and-feel can be improved and also some of the functionalities, like the zooming functionality.” (Q3).

“Please improve the lay-out.” (Q15).

“The usability for the service seeking citizen can be improved”.

“The text-to-map functionality would have my priority, but I thought the software was not very easy for use yet.” (Q7).

“I need more clarification about which button does what, exactly.” (Q6).

These statements confirm that the proof of principle should have been given a better interface and requires learning.

The objective parameters like speed and accuracy did not indicate better results than the applied traditional methods. When asked for their preferences via formalized other questionnaires and less formalized interviews, the evidence for a preference towards the digital map system was overwhelming.

The design question was as follows:

Could a digital map system support (afford) navigation of legal constraints more effectively than a traditional system using mainly texts?

From the results of Experiment [II], it can be concluded that:

¬ The actors do prefer a digital map-based system over a traditional text-based system.
¬ The actors do perceive service value for the affordance of the text-to-map function.
¬ No evidence was found that a digital map-based system helps to be faster or more accurate in the duration of learning provided. There was also no proof found that they would work slower of less accurate.
¬ Getting used to the text-to-map affordance will take time and learning and people seem to be willing to undergo this learning process.

In Chapter [V] I have followed-up on a design question as part of the main research
question about technology supporting the legitimacy of law. The design question here was
to formalize the *text-to-map* experiment. The conclusions of this chapter do justify further
research not only in the direction of digital maps as a valid technology, but also with regard
to the text-to-map service orientation. In this dissertation, more formalized experiments
concerning the learning issues noted in this chapter will not be pursued. The results of
this chapter indicate that the respondents saw most value in legal planning and finding
legal opportunity. Furthermore, Experiment [III] will test the system on these aspects in
the real world of policy formulation, legal planning, and fair interest balancing in order to
investigate if this technology would support co-creation of law. This was indicated by the NGO
representatives who are faced directly with the legitimation problems of law. It is interesting
that NGOs should mark this, as they seem to be at the opposite side of government actors
who are supposed to have the legitimation problem in the first place.

Additional findings

The assumption that a map-based system affords browsing aggregated data is
confirmed, but in a different and in a more complex manner than initially expected. As sta-
ted in Chapter [IV], one of the main design parameters of the system was the notion of ‘see-
king alternative locations’. By zooming in and out, the map ‘affords’ to navigate more muni-
cipalities at once. The regional level is the logical aggregation level of ‘alternative locations’
for the manager seeking the best spot available for his business activities among many mu-
nicipalities with their own jurisdictions. For the business manager, it also means he has
only to file his/her request once, rather than voice numerous requests at every municipal
front-desk. It was for this reason that the experiment scenario aimed at the aggregation level
of the regional authority or province.

This issue established during the explorative research helped to determine a
very important underlying design parameter for the next stage and the real-world service
infrastructure design. The system should be able to manipulate aggregation of relevant
objects and aggregation levels of the view in a consistent manner! In theoretical terms, it
means that the user should be able to address the view and the model simultaneously and
that the view would have to accommodate the changes in the model in a user-friendly way.

In technical terms, it implies that manipulation of a map (zooming in and zooming
out) would generate a consistent return of ‘hits’ that would have to correspond with the
area covered in the map. This is achieved by administering ‘geo tags’ to all legal and other
content (see Chapter [IV]). The assumption is that maps provide a more user-friendly viewing
interface and model operator at the same time *(see figure 39 on the next page)*.

The objection against single-use-only visitors concurred with earlier experience with
sophisticated query articulation (Peters and Wilson 2003). If one sidesteps from Google, it
requires learning that cannot be easily expected from end-users who only visit once. In Chapter
IX, I will report similar findings in Experiment [III]. This is a common problem with GIS
systems in “Participative GIS” or PPGIS (McCall, 2002). These findings may imply a choice for the target group in this research. In Chapter IV, I have already mentioned the fact that, in the Netherlands, someone with a legal problem is normally represented by the professional in court. Those professionals representing citizens in courts are not one-time visitors of a legal support system and we may assume that they accept a learning challenge. During the investigation, it became clear that Dutch stakeholders, when the stakes are considerable and the process takes some time, tend to organise themselves into representative organisations or what is called non-governmental organisations (NGOs). Due to this, I chose to treat NGOs and representatives of individual business managers as the same “client side” of legitimacy of law. This notion is supported by Pia Brundin who investigated the role of internet in NGOs’ growing influence: “Non-governmental organisations (NGOs) represent only one kind of civil society actors, but are generally considered the most important from a political point of view. The number of NGOs operating at an international level has expanded significantly during the previous century: from 176 in 1909 to 28,900 in 1993 (Thörn 2000). In the late 1990s, the number of international NGOs had increased to more than 40,000” (Brundin 2010, p. 218).

Figure 39: VMC model with additional consistency relationship.

**Reflections about usability testing**

In retrospect, parts of the testing methods used for Experiment [II] did not provide an approach to measuring maps against text that turned out completely satisfactory. I have chosen SUMI for its validation power and its repeatability, but the object of research deserves more attention, than I have been able to honour it with. I will elaborate in Chapter [X].
VI:

Conceptualization: 
*legitimation through co-regulation*
In that sense I am a good representative of the general public, since I cannot get very excited over a rodent like the korenwolf. I do get excited when I see a wonderful piece of scenery being destroyed by construction of a road through its face. Every phenomenon has its extremes. The korenwolf is an example of such extremes. We have to distinguish between what really matters. The Ecological Society will lose its credibility, when the local population feels the regulations are needlessly constrictive.

Hans Wijers

while accepting the chairmanship of the Dutch ecological society (Natuurmonumenten), Volkskrant, May 31st, 2012

http://www.volkskrant.nl/vk/nl/2686/Binnenland/article/detail/3263785/2012/05/31/Wijers-aanpak-files-gaat-soms-voor-natuur.dhtml
Overview of preceding sections

This research addresses the theme of technology in relation to the legitimacy of law. The main research question in the first two sections of this dissertation has been formulated as difficulties arising from a lack of proper access to existing law, legal effect planning and assessment of legal cases. The users of law, especially the business managers, have difficulties with finding out what they can and cannot do. The labyrinth-like qualities of law undermine its legitimacy. The legitimacy theme has been described in Chapters [I] and [II]. I have related legitimacy to ‘Le Contrat Social’ and breaches of that contract e.g. if governments implement systems that don’t explain the rational of their decisions, i.e. the computer says ‘no’, undermine that legitimacy. Likewise, the ‘moments of bewilderment’ of the users of law when they do not comprehend the relation between the objectives of laws and their effects in a certain case undermine that legitimacy. This theme is analysed from the perspective of Habermas (a gap between zwech-rational and substantiated rational legislation as explained in Chapter [II], what is called “verrechtlichung” by Habermas. (Habermas, 1975, P350, 1986 p.203)

The research outlined in the preceding sections, shows that technology and, more especially, Internet technology of maps and service infrastructures helps to improve accessibility of law and consequently supports legitimation of our legal system. The first experiment showed that map based access and planning were a promising research avenue. Maintenance of legal content and legal consistency were seen as a major problem. The second experiment provided substantiation through several feasibility studies testing the notion of an architecture based on sound principles such as standardisation, and interoperability. The design of solutions, like a legal service infrastructure for reduction of the ‘maintenance problem and the problem of legal consistency’, looked very promising. Experiment [II] included a usability test using a well-known and widely accepted method: SUMI. The result of Experiment [II] showed no significant difference between speed and accuracy between the traditional and the digital, map based system, but the users indicated a strong preference for the latter system. This is seen as the substantiation of the claim regarding legitimacy and technology. This chapter focusses on the support of technology for another part of the legal production chain. In this chapter we will look how technology may support the policymaking process, more specifically the legal drafting process. I will start with an explanation why the actors in earlier interviews pointed out the need for an improved interest-balancing process. Before I can investigate the role of technology, this problem space will be explored. I will start with a conceptualization of terms like co-creation, participation and co-regulation. This search reveals that the process of policymaking has different stages and that technology could have a different impact on those different stages. The search for improved legitimacy exposes us also to concepts like trust and transparency. From this exploration I will draw the conclusion that research about technology, participation and co-creation cannot be easily carried out from a safe academic distance. The characteristics of my research object has consequences for the method of investigation. I chose a living lab approach for that reason.
6.1. Setting the problem space

In Chapter [II] I mentioned the views of Hirsch Balin on the limits of what a government can achieve regarding its legislative capabilities and the start for a search for alternative forms of regulations, like self-regulation (Balin, 1991). Ten years later, the European Commission, in its quest for legitimacy, is much more explicit in its statements on participation during the entire cycle of policymaking (White paper, 2001, p.10). The discussions with our regional stakeholders in the Netherlands led to the belief that there was added value of the technology beyond legal effect planning and knowability. The stakeholders did see the potential for an additional design of map based technology supporting legitimacy. Both the participants in the experiment and the legislators from regional authorities expressed their interest in the system to support co-creation of plans and interest balancing, before the planning would become expressed as regulations. Some actors during the research refereed to this process as: ‘before it is fixed into legal concrete’. This will be the goal of the third section of the dissertation. The design questions here are about the extent to which a technology could enable a joint responsibility (co-regulation) of both the stakeholders and government for policymaking and the production of law.

The first section of this thesis dealt with those aspects of technology that, in terms of Habermas’s theory about legitimacy, can be associated with ‘communicative action and discourse’. The gap between the ‘Lebenswelt’ and the legal world as experienced by the citizen is bridged by knowability, effect planning and opportunity finding. This section describes the application of technology to support ‘the harmonisation of plans of action on the basis of common understanding’ (see Chapter [II]). The involved technologies are those of accessibility and knowability and the service architecture, but we will now also include other technologies such as internet fora, decision support systems, simulation and negotiation support that could contribute to the harmonisation of plans of action on the basis of a common situation definition.

The research presented in this section is also inspired by the increase of digital means that are being used by the general public and public authorities. The capacity to support legislative processes is increasing. On the other hand the problems of failing designs or extremely high demands of IT systems and the problems of alienation are also growing. The explorations and interviews with the ‘producers’ of laws and regulations and the ‘service consumers’ such as business managers, provided me with a challenge to use technologies not for improving access to law, but rather for supporting co-creation thereof. The participants in the experiments described before indicated that perfect access and ideal case assessment (knowability) would indeed solve some issues, but another major problem remained to be addressed. Specifically, they expressed a need for a solution that would help them to balance different interests during the design phase of the policymaking process. The Dutch NGOs were particularly explicit in their statements on the shortcoming of legal solutions without room for negotiations. The actors on the client side of the legal system were surprisingly categorical in their dislike of the current legal system’s ‘inadequacies’.
They observed that ending up in court was time consuming, inefficient, expensive, and not satisfactory for anybody. This can be illustrated with the statements of the chairman, Fred Wouters, of the very powerful National Dutch bird protection agency ‘Vogelbescherming Nederland’\textsuperscript{111} with over 150,000 members. Fred Wouters was very clear in his speech concerning the reorganisation of the Dutch area of the IJsselmeer\textsuperscript{112}. This lake is the second largest sweet water reservoir of Northern Europe which plays a vital role in the migration paths of many bird species. He stated that, in the last 25 years that he had stood in court, he had won about 50\% of the cases based on the Habitat Directive\textsuperscript{113} and the Natura 2000 Directive\textsuperscript{114}. This sounds as a high win score; however, he was not satisfied at all. The birds he was supposed to protect required more, or rather more uninterrupted, interconnected space. The side effect of the current legal system was a fragmented ecology. He argued that agreeing beforehand on substantial non-fragmented green areas would be much more beneficial for the ecology. 

The same line of argument was used by Eelco Brinkman, ex-minister and Chaiman of the Dutch Building association: [\ldots] Opmerkelijk is dat we in Nederland bezig zijn met gebiedsontwikkeling, maar we ontwikkelen alleen maar in gebiedjes. Als een groter gebied wordt beschouwd, dan bestaat een veel grotere kans op een win-win situatie. Werken op een grotere schaal zal leiden tot een betere structuur voor natuur en ecologie’.

\textsuperscript{111} http://www.vogelbescherming.nl/over_ons/de_organisatie
\textsuperscript{113} http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm
\textsuperscript{114} http://ec.europa.eu/environment/nature/natura2000/management/index_en.htm
Translation: *It is remarkable that in the Netherlands we aim for spatial development, but in reality we concern ourselves with very small spaces. One would achieve a higher success, when the problem would be approached from a larger perspective. Applying a larger scale will improve the environment and the ecological structure [...]. (Eelco Brinkman, Chairman NGO Building association Bouwend Nederland’, same report, 2008).

In appreciation of his statements, the 200 planners and stakeholders assembled gave Fred Wouters a standing ovation. The Director General of the National Minister of Dutch Water management, Annemiek Nijhof, agreed that ‘rules were made by men and should support the case and should not become a malfunctioning bureaucracy where we all lose money on consultants and juridical procedures’. The same position was voiced by the Director of the Dutch Natural Resources (Natuurmonumenten) who indicated that he ‘had learned from the opposition against IJburg where he was left with nothing and he now has changed his strategy towards joint design efforts to ensure a reasonable outcome including a ‘green investment package’ (J. de Graeff, 2009). What these leading NGO and senior Ministry actors proposed is a form of what we call ‘co-regulation’ of law. In fact, what he argued for, was a way of legal drafting that would take into consideration the many different types of constraints that affect decisions about geographic planning in the ecological area. All attendants to this meeting were concerned about the fragmented outcomes of existing policymaking processes that didn’t serve any stakeholders interest in the long run. What was needed was a policy making process that would allow the stakeholders to express their interests, check the outcomes against desired outcomes and legal constraints by other stakeholders, taking into account different regulations etc. This way we could satisfy the needs of different stakeholders in a more balanced way. Mr. De Graeff suggested that this required a form of ‘legal constraint satisfaction’ with multiple stakeholders. This would require a better engineered legal drafting process with more design input from the stakeholders in order to produce more balanced and integrated area planning with more positive effects for ecology and stakeholders. The attendants preferred such a policy making process over the current one as they wanted to avoid litigation as much as possible. Several statements made during the event confirm the negative outcome of litigation in general, but this observation is also supported by literature: ‘Litigation can be damaging to both parties in a dispute. It is a zero sum game; in what one party wins the other loses. It is actually worse than a zero-sum game and indeed can lead to a lose-lose result. This is because of the large legal fees arising from litigation’ (Zeleznikow and Belluci, 2003, p.21).

6.2. The government perspective

During the research among civil servants, I was repeatedly informed about the sensitivity of decision-making processes. The regional government has to act as facilitator...
in the process of solving the ‘NIMBY’ problem and they have to be completely in control of that process, otherwise, they will lose their credibility. Facilitating deliberation is seen as part of the raison d’être of the regional authority and the political consequences can be huge if things go wrong. Because of the fallen support for the Oostvaarderwold plan, the entire administration of the Flevoland region had to resign in October 2012.

Figure 1: The ambitious Oostvaardewold ecological plan that caused the entire regional government of the Flevoland Province to stand down when National funds were not allocated in 2012.

This Oostvaarderwold plan, that included a 400 million euro investment, concerned a 1800-hectare area, which is quite large for Holland. The intention was to create one overall ecological infrastructure that interconnected the few Dutch green patches into one larger scheme of 15,000 hectares (ecologische hoofdstructuur). In 2010, five years after the initiation of the plan, the 240 million euro National financial support was withdrawn, but other funds were found. The political leaders in the region were still accused of taking too many financial risks after 7 years of planning. A group of 14 farmers had filed a court appeal against the plans at the State Council (Raad van State) and this council ruled against the plans in 2012. This case demonstrates that policy-making is a lengthy matter associated with high risks. The balancing act with legal regimes is also very complex. Furthermore, the outcomes of such policy-making processes are intended to have some effect in society, but the actual effects may be quite different from intended ones. The Dutch provinces have several examples of non-intended effects of regulations. I will explain one example as an illustration of how regulations resulting from a policy making process had an unintended and costly effect on society.

116 http://www.raadvanstate.nl/pers/persberichten/tekst-persbericht.html?id=409
For the Province of Zeeland, finding a balance between salt and sweet water is a big concern, affecting biodiversity as well as agriculture. A specific national regulation, based upon a European directive on water management, comprised a subsidy for farmers that lacked sweet water while those farmers had one of the best crops in Europe. This problem was caused by the application of norms that were also applied in other Dutch provinces. These Provinces had much lower salty soils, but the norm and the rule were inseparable. The legal mapping of the ecological reality here failed to cover the contextual significance of salt-levels. The ecology in this province was adapted to the normal “saltiness” and the subsidy completely failed to achieve its goals. The subsidy for the farmers at the expense of the province was a costly but ineffective instrument. This particular case not only demonstrates how environmental intentions work out the wrong way, when they are rigidly translated into fixed regulations or – to be more precise – fixed norms. It also caused the umbrella organisation of Dutch regional authorities (IPO) to take action. They decided to increase their involvement in the then recently initiated European INSPIRE programme and took over the chair of the meta data committee of INSPIRE (Peters, 2007).

This case also demonstrates the need for governments – including the Dutch regions – for a policy making process that leaves them room for manoeuvring, comparable to the need for manoeuvring space of the other stakeholders as described in the previous section. This should not be limited by inflexible standardisation fixed in inflexible legal frameworks. As we will see, the legislators on regional levels see themselves as moderators of such policy making process. Their view will guide the search for the best designs to satisfy the stakeholders. In the next chapter technological instruments like explorative “visualisation of seeking areas” and the technology derived from the gaming industry will be introduced to enhance the discourse support for stakeholders.

“The basic concepts of the democratic rule of law are not really in dispute, not even in society. Nevertheless, one should investigate the workings and course of public bodies given technological and societal changes.
(Raad Openbaar bestuur, Trias Telematica, 2003).
6.3. Conceptualization, terms and definitions

The cases described in the previous two sections show the need expressed by different stakeholders in policy making, including NGOs and regional governments, for a policy making process that recognizes the different positions of stakeholders and promotes a conflict resolution strategy at an early stage in order to prevent costly and ineffective litigation at a later one. The answer to the current policy making problems were to be found in some form of co-creation. There are some issues with the term co-creation, however. What is co-creation within a policy making context? The claim is that it supports legitimacy of law as a specific form of open discourse. The question is to what extend does co-creation results in the intended legal alignment and would such open discourse help to build legitimacy? Could we support such co-creation process with adequate technology and what would be the users of such technology? What are the problems those users are facing now and how could the technology help them overcome these barriers? What would be typical use cases for which the technology should provide a solution? I will explore these issues and try to answer these questions in the next sections.

6.3.1. Co-creation in economic context

The term ‘co-creation’ is derived from economics and was preliminary used in the context of value chain theory. (Adrian F. Payne et al, 2008, 2012) provide an illustrative listing of increasing responsibility of the “customer” and the role of the “producer” as facilitator of the joint effort:

**First** – is the emotional engagement of customers through advertising and promotional activities (e.g. Club Med, the French package holiday company, creates a strong emotive appeal through highly distinctive advertising).

**Second** – is self-service, where there is a transfer of labor to the customer (e.g. IKEA the Swedish retail giant, actively involves its customers in key activities such as transportation and assembly of flat pack furniture).

**Third** – is where the supplier provides an experience and the customer is part of this context (e.g. Disney Theme Parks place great emphasis on the customer experience. Employees, known as ‘cast members’, follow carefully scripted roles to create a ‘theatre’ experience for their ‘audience’).

**Fourth** – is when the customer self-selects, using the supplier’s prescribed processes, to solve a particular problem (e.g. Citibank, the global bank, provides interactive voice and keyboard response systems for customers contacting their call center).

**Fifth** – the customer and supplier engage in the especially important activity of co-design of products (e.g. Intuit, the producers of ‘Quicken’ financial software, use every employee as a ‘listening post’ to gain profound customer insights which are utilized in helping customers co-design their products).

This listing is the perspective from an economic value chain. From the technology design perspective, the term “prosumer” emerged in the late eighties: in their 1972 book *Take*
Today, Marshall McLuhan and Barrington Nevitt suggested that with electric technology, the consumer would become a producer (McLuhan et al., 1972, p. 4). In the 1980 book, *The Third Wave*, futurologist Alvin Toffler coined the term “prosumer” when he predicted that the role of producers and consumers would begin to blur and merge. Toffler envisioned a highly saturated marketplace as mass production of standardized products began to satisfy basic consumer demands. To continue growing profit, businesses would initiate a process of mass customization that is the mass production of highly customized products. However, to reach a high degree of customization, consumers would have to take part in the production process especially as concerns specifying design requirements (Source: Wikipedia a perfect example of prosumership). The current Web 2.0, 3D printing and social media supported social networks using tools like Twitter, Facebook, and Appstores supports the argument that the “prosumer” has in fact arrived. The strikes of traditional service suppliers against very successful prosumers-driven initiatives like ‘Uber’ (private taxi) and ‘Airbnb’ (a private house as a hotel for travelers) indicate that this shift doesn’t happen without struggles.\textsuperscript{118}

The **co-creation** as defined in the context of the creation of goods and **co-regulation** as defined in the context of the creation of legislation have many similarities, but the government has a specific and vital role of being the ‘moderator’ and ‘facilitator’ of the legal process however, a role that is bound by the same legal process. Co-creation in the ‘free market’ with suppliers of goods and services may have different mechanisms for legitimacy, trust and escalation. The very concepts of ‘government’ and ‘Le Contra Social’ are related to the need for ‘governance’ and for ‘regulation’. Perhaps, government can facilitate the levels of co-regulation in some ways that are similar to the technology driven developments in the “free market”. Van Duivenboden and Bekkers also touch upon the term legitimacy and a form of co-makership. Co-regulation and participation can stem from the same intentions of government to allow for citizen influence at other moments than democratic voting. In his contribution to “client oriented government services”, Victor Bekkers adds ‘participative services’ to the list of government services that would constitute the core of eGovernment services (Bekkers, 2001, p. 50). I will elaborate in chapter [XI].

### 6.3.2. Is co-regulation the same as participation?

When co-regulation and participation are under consideration, it appears that the way of balancing priorities between different interests becomes an essential element for further study. With co-regulation, however, there is a shift in the citizen-government relationship. Government transfers responsibility to groups of citizens to do the balancing act themselves. […] Op het terrein van wonen, wijkbeheer en zorg voor de publieke ruimte, ontstaan op het snijvlak van openbaar bestuur en burgerparticipatie nieuwe vragen van uitoefening van publieke verantwoordelijkheden. Het gaat hierbij om nieuwe vormen van maatschappelijk middenveld zoals organisaties van wijkbewoners en burgerschapsinitiatieven. Nu al wordt op veel plaatsen geëxperimenteerd met het leggen van initiatief, verantwoordelijkheden en beheer bij
groepen van betrokken burgers. Dit betekent dat er nieuwe vormen moeten worden gevonden om burgers te kunnen belasten met publieke taken, te betrekken bij de uitvoering van beleid en onder omstandigheden te laten besluiten over de aanwending van publieke middelen. In het Verenigd Koninkrijk is gebleken dat er bij dergelijke initiatieven grote behoefte bestaat aan enige vorm van een afgescheiden rechtspersoonlijkheid (public trust) waarin de gemeenschappelijke activiteiten kunnen worden ingebracht’. (P. Donner, Jaarverslag Raad van State 2012, p. 22.)

Translation: [...] “Regarding the domain of housing, neighbourhood care and care for public space, on the boundary between public administration and citizen participation, some new questions arise about public responsibilities. These questions concern new forms of organisation for neighbourhood care and civic initiatives. There is much experimentation going on with transfer of initiative, responsibilities and maintenance to groups of engaged citizens. This development implies that we need to design new forms of entrusting citizens with public tasks, to include them in the policy implementation process and – under certain conditions – with the allocation of public funds. In the United Kingdom one has unveiled that such initiatives have need of separate legal entities (Public Trust) that can act as container for such common initiatives.” (P. Donner, yearly report, Dutch State Legal Council, 2012).

In the citation above council chairman Donner makes a distinction between influence on the implementation of policies and the (conditional) power to decide about public money. This distinction appears to be significant, since at that moment people have to make choices and become responsible for the outcome. As mentioned in Chapter [I], this is in essence a reversal or a modernisation of ‘Le Contrat Social’. The difference between co-regulation and participation could be defined as the level of ‘responsibility’ that the non-governmental actors take for the outcome of the process.

In present research, I will treat participation and co-regulation as essentially different gradations of shared responsibility for prioritisation and interest balancing between actors from government and actors from stakeholders. These gradations are identified by two aspects:

¬ Taking responsibility for the allocation of money between different priorities
¬ Taking responsibility for the design of legislation that sets the norms and constraints for fellow citizens.

My research focus is not on socio-political research about participative government itself.

Rather, my focus is on technology support for co-regulation in the sense of taking responsibility by citizens for the design of legislation that sets norms and constraints for other citizens. The question for my research is not who gets the power to decide. The question is how a well-designed decision can be reached with the support of technology.
In my research the focus on supportive technology for co-regulation is strongly connected to my desire to improve legitimacy. As already stated in chapter [II], this stance is also taken by Senden who explicitly connects legitimacy with co-regulation (Senden, 2005). This author has collected a set of definitions from the European Commission where co-regulation is defined in the Inter-Institutional Agreement on better law-making as follows: [...] the mechanism whereby a Community legislative act entrusts the attainment of the objectives defined by the legislative authority to parties which are recognized in the field (such as economic operators, the social partners, non-governmental organizations, or associations). Application of the notions of flexibility and differentiation and of the principles of subsidiarity and proportionality are not aims in themselves; they are considered to contribute to enhancing the effectiveness, legitimacy and transparency of Union action [...] (IBID Point 18).

Senden continues her line of argument, stressing that Europe’s quest for legitimacy is diverting from fewer regulations because of the so-called ‘administrative burden’ as the main driver towards better law-making and more involvement in drafting before the regulation is designed: Senden lists a sequence of European documents that pave the way for alternative legal drafting methods: [...] The quality, relevance and effectiveness of EU policies depend on ensuring wide participation throughout the policy chain – from conception to implementation. Improved participation is likely to create more confidence in the end result and in the Institutions which deliver policies. Participation crucially depends on central governments following an inclusive approach when developing and implementing EU policies (White Paper on good governance, European Commission, 2001). ‘The 2001 White Paper on European Governance, the 2002 Commission Action plan and the 2003 Inter institutional Agreement on better law-making the determination to resort, where possible, to self-regulation, co-regulation and soft-law instruments and mechanisms has been confirmed [...] (Senden, 2005, p. 9).

Senden defines the top-down legal drafting as ‘classical-liberal’ and, quoting Pescatore as founding father of the European Union (Pescatore ’74) names the co-creation the democratic-social variant. Senden elaborates at length on the difference between self-regulation (bottom-up) and co-regulation (started top-down with public involvement). Her observations do support our notions of co-creation or co-regulation as instrumental to better legitimacy, however, they do not tell us how co-creation or co-regulation should be achieved, or by what metrics we should measure the quality of co-regulation (IBID, p 12). Senden describes co-regulation in a number of areas such as social law, and she pays special attention to developments and problems with regard to environmental law. These problems seem to concentrate on the targets as set in article 174 of the Treaty with very clear objectives. Senden states that it is often questioned by European politicians whether parties would ever come to agreements that would actually achieve those environmental goals when they are not set in the classical top-down manner: [...] “Obviously, these observations have been induced by

the concern that the decision making competence which these two institutions have been assigned in the area of environmental law and policy on the basis of (now) Article 175 EC, run the risk of being ‘hollowed out’ by the use of – voluntary – European environmental agreements.” [...] (Senden, 2005, p 16).

Out of fear that those environmental objectives are not going to be met, the European Commission articles aim to build top-down safeguards around the co-regulated agreements. This is different from our starting point of the research. Senden states: [...] Clearly, there is considered to be a need for a fairly strong legislative framework, setting out the targets and monitoring mechanisms for ensuring compliance, but it is left to the parties in the field to take the measures necessary for achieving these targets, by way of concluding an environmental agreement. [...] Senden is also questioning the achievement of goals without top down safeguarding structures.

The NGO-chairman Wouters in our example pleads for co-regulation because of the failure of the 'official' legal system to achieve the desired targets and the effective balancing of interests. Notwithstanding the differences in the effectiveness of co-regulation regarding policy targets, it is relevant for our research question that Senden refers to some of the criteria the Commission has set for co-regulation regarding the quality of the drafting process: [...] It is also stated that the Commission will give ‘due attention’ to the following criteria: cost-effectiveness of administration, representativeness, quantified and staged objectives, involvement of civil society, monitoring and reporting, sustainability and incentive compatibility. If the agreement fails to deliver the expected results, the Commission can always make use of its right of initiative and propose legislation. [...] Some of these criteria are remarkably close to those of open discourse and communicative action requirements as set by Habermas (see in Chapter [II]) and effective administrative infrastructures as set by Venrooy (see Chapter [III]). Although Senden does raise the issue of the effect of co-regulation on legitimacy in her work, it remains unclear whether this is used in the meaning of acceptance and understanding by the actors or stakeholders involved (i.e. True substantial legitimacy as described by Pescatore), or, alternatively, whether it indicates the ‘legal’ legitimacy (legitimacy by rule of law) only. In any case, I found no research concerning the effects from co-regulation on the stakeholders. [...] Whether the use of voluntary social and environmental agreements in practice complies with the requirement of good governance should ultimately be assessed on a case-by-case basis [...] (Senden, 2005, p. 21). The connection made in Senden’s article with Pierre Pescatore’s work on substantial legitimacy and co-regulation is helpful to underline the relevancy of our research question, since Pescatore was, by writing the 1957 treaty, what is now called: ‘one of the founding fathers of the European Union’. (P. Pescatore, 1974, p.505-506.)
6.3.3. Digital technologies and co-regulation

In the recent past, many digital tools have been designed and built to support participation or similar processes. One could argue that a design theory about communicative action and discourse - and especially about legal discourse - should take into account those supporting designs. These technologies range from collaborative group support, through petitioning, eVoting, argumentation support, conflict resolution to participative GIS.

In Chapter [II], I mentioned the work on legal information serving as a relevant alternative for text-based database retrieval as a means for case assessment. Winkels discusses conflict resolution using “meta-legal knowledge” while investigating legal information serving systems and building blocks. In this article, the argumentation as part of the assessment process of the actor is described and reframed as the normative qualification (allowed, disallowed or indifferent) of cases in the context of norms and regulations. The conflict resolution is introduced as the knowledge necessary to determine which norm applies to the case when more than one norm is relevant (Winkels, Boer and Breuker, 2002, p. 134). Legal argumentation support could be used to enable businesses and individuals to better understand and navigate within and between legal cases. Traditional eDemocracy technologies such as polling, petitioning and voting are manners for a citizen to voice an opinion, but are not supporting citizens in taking (shared) responsibility for the balancing act. Using these technologies would still leave the government as being the mandated authority in the sense of ‘Le Contrat Social’.

6.3.4. Scoping of co-regulation

In the research described in this thesis the focus is not on ‘traditional’ eDemocracy technologies, such as voting, polling or petitioning. Typically voting, polling or petitioning would require an already well-articulated set of possible outcomes at a later stage. I rather will focus on a more preliminary stage of creating regulation, particularly on the stage where planning is not fixed and alternatives are still ambiguous. I limit the investigation to technologies supporting co-regulation in the spatial planning domain. Furthermore the focus is on harmonisation of plans of action and common situation definition.

The table on the next page provides a list of related technologies and applications. In this list I have indicated which technologies will be taken into consideration as part of the technology for supporting co-regulation.
Table 1: with different technologies supporting deliberation.

<table>
<thead>
<tr>
<th>Digital technology</th>
<th>Application</th>
<th>To be included in the co-regulation support technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>eVoting and polling</td>
<td>Digital support for casting choices</td>
<td>No</td>
</tr>
<tr>
<td>ePetitioning</td>
<td>Digital support for policy statements directed at government</td>
<td>Partly</td>
</tr>
<tr>
<td>eParticipation</td>
<td>Digital support for joint policy making</td>
<td>Yes</td>
</tr>
<tr>
<td>Collaborative systems</td>
<td>Group decision support</td>
<td>Partly</td>
</tr>
<tr>
<td>Participative GIS</td>
<td>Digital support for map-based joint spatial planning</td>
<td>Yes</td>
</tr>
<tr>
<td>Argumentation support</td>
<td>Digital support for prioritisation</td>
<td>Partly</td>
</tr>
<tr>
<td>Fora, social media</td>
<td>Digital support for group discussion</td>
<td>Partly</td>
</tr>
<tr>
<td>Retrieval</td>
<td>Digital support for retrieval of legal information</td>
<td>Yes</td>
</tr>
<tr>
<td>Legal servicing</td>
<td>Digital support for the processing of a case</td>
<td>Partly</td>
</tr>
<tr>
<td>Web casting annotation</td>
<td>Digital support for the understanding of the political debate</td>
<td>No</td>
</tr>
</tbody>
</table>

6.4. Conceptualisation: is participative GIS the answer to co-regulation?

In 1969 Sherry Arnstein published an influential citizen participation model. In those days of the 60s there was little role for technology in the normative debate, however, this model was adopted and modified by many other researchers. In 2001, the OECD adopted the model in a less radical form, thereby losing some of its granularity (OECD, 2001, P38).

A term that is close to ‘participation’ that deals with the commutative aspects in the debate about co-regulation is ‘deliberation’ (Black et al, 2014). Both terms have frequently been used to describe the same topic and sometimes they are used together (the participation of citizens in the process of deliberation). I will become more specific about the applicable terminology based on the results of Experiment [III] in Chapter [IX]. Ake Grunlund and Kim Viborg Andersen define eParticipation as: ‘... eParticipation refers to ICT-supported participation in processes involved in government and governance. Processes may concern administration, service delivery, decision making and policy-making’ (Avdic, Hedström, Rose and Grönlund, 2010). Instrumental eParticipation research, by contrast, involves the
following: [...] Determining the tools and methods which are appropriate for pursuing these goals. Here researchers have the task of understanding the different contexts of eParticipation, and developing better frameworks, procedures, methods and software tools for varying contexts and objectives. This research has the objective of improving the practice of eParticipation [...] (Sæbø et al. 2009). In their article about the disappointments of the political idealists when the internet technology did not bring democratic utopia, Hartz and Sullivan are proposing a different, less ambitious line of practices for ‘eDeliberation’. (Hartz, 2014). Specifically, they propose to limit the role of technology to the role of informing participants about the ideas and plans of other participants rather than the role of co-decision making.

Figure 2: Ladder of citizen participation.

This body of PPGIS-research addresses the questions of involvement levels, trust and interactivity. Michael McCall explicitly supports our research claim that map based participation may support legitimacy of government and lists some boundary conditions of good governance that should be met in order for PSP to be called ‘good governance’, namely:

- Legitimacy, Participation;
- Respect for Rights, Empowerment;
- Equity (not simply equality);
- Competence (including efficiency).
These boundary conditions are remarkably close to our operationalisation of the list of boundary conditions in communicative action defended by Habermas. McCAll suggests that GIS or smart maps in themselves are not sufficient instruments. While quoting the United Nations definition of good governance, his line of argument is, that “real active” participation “from beginning to end” is required to support the claim of improved legitimacy. Carver argues that ‘GIS-based decision tools need to be exploratory rather than definitive’. (Carver, 2001). In Chapter [II], I have introduced Oosterhout as a researcher investigating legitimacy based on concepts such as ‘Institutional theory, citizens attributing ‘taken for grantedness’ and the characteristic ‘responsible’. Oosterhout defines the legitimising process as a constant attributing process of the characteristic ‘responsible’. Carver’s statement qualifying GIS decision support systems rather as explorative than as decisive, adds another piece to the puzzle of digital support for legitimacy. His arguments are in line with Oosterhout in the sense that they highlight the notion of a cognitive process where actors can actually see each other exploring the available space in a responsible manner. The explorative act, that is to be made visible in a digital GIS system, is in itself a speech act that conveys a willingness to harmonise plans of action. In Chapter [VII] I will introduce a GIS visualisation of ‘negotiation space’ that combines Carver’s position about ‘explorative’ versus ‘definitive’ and Oosterhout’s views on ‘cognitive understanding of responsibility’ as building blocks for improved legitimacy. The theory is that if actors can literally see how other stakeholders try to take into consideration not only their own interests, but also those of their fellow citizens, this would build the cognitive narrative of a responsible actor (which could also be government). The narrative is the storytelling among participants that leads to the constructed reality (Koerten 2011).

Pickles had a view about GIS and legitimacy already in 1995, two years after the launch of the first web-browsers: [...]GIS and related electronic technologies sit on the fulcrum of changing social, economic, and political relations of production and consumption, and are as likely to enhance undemocratic as democratic outcomes, inequality as much as equality, surveillance as much as freedom. For these reasons ‘GIS requires a critical theory reflecting sustained interrogation of the ways in which this and related technologies re-configure social relations and contribute to the emergence of new geographies’ (John Pickles, 1995). In relation to my research question, the problem with all this work on PPGIS is, that existing PPGIS theories and empirical research do not concern legal services or any infrastructure beyond an ad-hoc tool and specific spatial planning application scenarios. As we have seen in Chapter [IV], this is not considered efficient by our stakeholders and the expert target group. They require an infrastructure and a more structural and systematic approach to balance interests, find opportunities and avoid fragmentation. I did not encounter any connection with structured legislative drafting other than the obvious part that any discussion supports the plan before it becomes legally binding (Peters et al, 2008). For example, many discussions deal with the technical aspects of improved interface design. Gonzales provides an extensive list of constraints (and benefits) on the use of GIS in his Irish Government manual for INSPIRE planning and environmental assessment, none of which is affecting the juridical domain (Gonzalez, 2009). Most deal with the required technical GIS-skills which again supports
Alexander Boers’ observation ‘that spatial legal planners operate in an interesting but isolated niche of the legal science’ (Boer, 2008).

6.4.1. PPGIS problem A: Incidental rather than regular service with an infrastructure

Participative GIS is considered relevant and capable of supporting to our research aims, since it supports the notion of maps as a technology supporting legitimacy issues. PPGIS do not, however, provide the answer for legal information provision using maps as a structured service based on architecture, standards and repeatable infrastructure (Peters & Wilson, 2008). In PPGIS research a number of critics have warned of the danger of technology aspects and technologists dominating the process: [...] In reviewing alternative locations for a power line in West Virginia, citizens’ groups complained that the planning professionals hi-jacked the GIS and multimedia tools and excluded local concerns over data categories and weighting of impacts (Towers, 1997; King, 2002). ‘Technocratic planning models replaced ‘neighborhood discourse’ in a Minneapolis Neighborhood Association and introduced alien terminology, concepts and decision approaches which excluded the marginalised and less articulate- the elderly, blacks, and renters, whereas those who could adopt the jargon and the GIS milieu felt more empowered’ (McCall quoting Elwood, 2002; Aitken, 2002). The same is observed in a report from Cap Gemini/TNO as an ‘unfulfilled need’ in the European public sector: Assessment of policy/legislative acts compliance with citizens and stakeholders priorities, upon deliberation of new plans, laws or regulations (Innes and Booher, 2004; Cap Gemini and TNO, 2004).

Molinari describes a range of tools and pilots in spatial eParticipation projects like Demos-plan and explains the need for formal legislative bases for technology-enhanced co-regulation in spatial planning and environmental issues. However, he does not provide models where this integration with the legal production process is the case: ‘This paper makes the point that a necessary precondition for any business model to ‘square’ is the formal integration of (non-electronic) participation in the legal or regulatory framework the targeted organisation belongs to’ (Colombo et al., 2011). (Molinari, 2011). The claim of Demos-plan as co-regulation platform is close to that of the approach chosen in this research, however. ‘It allows statutory stakeholders to manage submissions internally by requiring one representative to sign off the submissions from different departments. These submissions can be linked to a particular paragraph of the planning document and/or the participant can draw on a map of the plan’.

In 2012, the PEPnet tool won a prize for the most innovative eGovernment project in the German speaking world (PEPnet122). In 2013, Farina described a promising line of participation in relation to law and policy-making that implemented some of the ideas of the Obama administration about transparency and improving public services (Farina, 2013, see also http://regulationroom.org/ and the eRulemaking initiative) I will come back to this issue in Chapter [XI].

122 http://pep-net.eu/
Figure 3: an illustration of the co-regulation room at http://regulationroom.org/.

**Coming Soon**

We’re gearing up for the next rule!

### 6.4.2. PPGIS problem B: Focus on power, technology and interaction metrics rather than on law

As stated earlier in Chapter [II], another researcher using Habermas’s views on open discourse to investigate the map-based decision support and conflict reduction or prioritisation was Jim Sheffield. In his research he found that one of the problems with participative GIS was the constant debate about the meaning of the evaluation metrics used: ‘The second set of problems was associated with ongoing confusion about the conceptual basis for evaluation of the scenario options’ (Sheffield, 2007). Although from the feedback in experiment [III] supporting evidence for this point could be taken, this issue wasn’t part of my research focus. I will return to this issue in Chapter [XI]. The goal of this research is to approach the problem of communicative action from a design perspective and avoid the normative debate, where discussions metrics and technology are mixed with normative ideas about power distribution.

### 6.5. Stages and technologies

There is evidence that stages play an important role in the contributions that technology can make to legitimacy. In Chapter [II], I mentioned some views on staging models of policy making (Sharpf 1999 quoted in Grimmelikhuijsen 2012 and Carver, 2001). Wyner, Atkinson and Bench-Capon (Wyner et al. 2011) point out the lack of a theoretical framework that could provide for a basis for research upon digital group decision support for legal issues.
While investigating support tools and designs, they provide the following overview of ‘stages’ where technology could provide help in what they call “policy making”.

**Evaluation stage:**
policy analysts look at existing laws and regulations, considering how the latter achieve the intended goals and identifying conflicts among goals.

**Agenda setting stage:**
based on the evaluation, public administrators define areas for change or improvements.

**Policy formulation stage:**
given an agenda, policies are proposed and criticized.

**Decision stage:**
after consultations about the proposed policies, the draft laws and regulations are introduced into the legislative process.

**Implementation stage:**
Once enacted, legislation is enforced.

‘The IMPACT Project contributes to the policy formulation stage, where proposed laws and regulations are made available for comment to the general public as well as to a selection of stakeholders with a special interest in topics of the policy. Presuming that the policy has been formulated, we can refer to the commenting activity as policy consultation’ (Wyner, Atkinson and Bench-Capon, 2011). The law is clearly defined here as an interactive and cyclic legislative production process with different stages, not as a given fact. It also provides the basis for modelling technological contributions at different stages to support knowability, effect planning and co-creation of law.

I propose these additional stages in line with Grimmelikhuijsen, Wyner and co-authors, because they are relevant for the distinction of several digital functionalities or affordances provided by digital maps. The explorative stage could even be further refined at a criteria-setting and a deliberation stage (Bench-Capon and Prakken, 2010). These stages can be relevant for the design for two reasons, namely:

- Different technologies could contribute at different stages of the legislative cycle from drafting to evaluation.
- Contributions to increased legitimacy by co-regulation may be valued differently at different stages of the process.
- Experiment [I] and [II] addressed the knowability of law in a consolidated phase after implementation and during enforcement. The next experiment should address a design phase where law is not yet fixed.
For all these stages one could apply the demands for open discourse and communicative action as set by Habermas (see also Chapter [II]). As we have seen earlier, Grimmelikhuijsen has shown empirical proof of the role of (map-) technology on the policymaking result explanatory stage where information about the result is given to explain the balancing act. The policy making cycle from policy formulation towards decision, implementation and enforcement has stages and timing; a temporal aspect. The costs for stakeholders and society and therefore, the damage to legitimacy are perceived as much higher at the end of the cycle towards the stage of implementation and enforcement. This perception of the stakeholders and the moderating authorities is consistent with Habermas’ views. It is already beneficial to inform a constituency of stakeholders of each other’s plans and views at the exploration stage. To be able to explain the outcome of constraint satisfaction is very beneficial to legitimacy in the sense of open discourse of Habermas. Habermas did not value perfect constraint satisfaction in an objective sense, but the achievement of common understanding and the ability ‘to harmonise plans of action based on common situation definition’ in a more intersubjective or social constructivist sense (see Chapter [II]). Habermas was not inclined to use strict calculation mechanisms to measure legitimacy. Unlike Marx and Weber, Habermas considered that true legitimacy was in the open discourse (communicative action) that enabled harmonisation of plans. In a spatial context, the digital map may very well provide additional support for what Wyner, Atkinson and Trevor Bench Capon call the “policy formulation stage”. Van Engers and Boer provided a model of cyclic policy making process with an emphasis on the availability of legal source material. (van Engers and de Boer, 2010). Van Engers and de Boer define policy making as: ‘the process that leads from identifying a problem to the formulation of a policy to solve it’. Their emphasis is on structured deliberation support, based on a more rational definition process of the policy-effect theory, which is used by the policymakers (van Engers et al, 2011).

In a number of studies, (e)Participation is seen as a stage in the legislative process. In a study of over 20 eParticipation projects in Europe, the authors provide a graph showing eParticipation initiatives positioned at different stages in the legislative process (M. Bicking and M.A. Wimmer, 2010, P.259). The graph mentions: ‘Policy Draft’, ‘Policy Formation’, ‘Policy Implementation’, and ‘the whole policy process’. Only one project in this study qualifies as addressing the whole legislative process. The authors argue a case for sustainability and continuity of such initiatives. The staging of policymaking sheds a different light on the role of technology and legitimacy of law. Therefore, I will argue that the digital map technology will provide additional support for what I call the explorative stage (in line with Carver, 2001), the consideration stage and the explanatory stage. Figure 4 shows a visualisation of the staging model of co-regulation on the next page.
6.5. Conceptualisation: on the ‘costs’ of decreased legitimacy and questions about timing and stages

Habermas, Pescatore, Senden and others (see earlier Chapters) speak of the legitimacy of our legal system as something that can be undermined or lost. As far as I have been able to discover, this notion of decreased legitimacy has not been operationalised in terms of increasing or decreasing metrics. Legitimacy can be increased (gain) or decreased (cost), but I have not found a scale for it in existing literature. Therefore, it is difficult to link the concrete contribution that technology could make to legitimacy costs or gains. In
Chapter I have defined legitimacy cost as damage to the fabric of commitment from citizens to government to obey laws, follow rules and stay civilised as once formulated in ‘Le Contrat Social’. The operationalization of those costs is the effort that government has to invest for reparation (see glossary of terms). Is it possible to define a method or a paradigm that unveils the influence to that fabric of commitment? The focus of the present research is on the interaction between business managers and government that is regulated by law. This interaction requires a mechanism - an effective bureaucracy - to cope with large amounts of interactions, myriad and pluriform regulations, and many interests that need to be balanced. The question is, if it would be possible to define a common perceived impact on this fabric of commitment?

Many authors in the Netherlands use the term ‘draagvlak’, which could be translated as something between acceptance, public support, and recognition, but few attempts appear to have been made to measure the increase or decrease of this ‘draagvlak’ in empirical terms. During my research, I did encounter one dimension that all authorities and actors involved seem to acknowledge as relevant, which had to do with the aspect of timing. There is evidence of a relationship between perceived costs of legitimacy and the stage at which the co-regulation or policy making is in the legislation cycle. The first assumption is, that it is more damaging to legitimacy when reparation regarding the perception of the interest balancing process has to be applied at a later stage in the policymaking cycle. The closer the cycle comes to the moment of decision the higher the perceived societal costs of repair in conflict resolution (renewed interest balancing) and the perceived loss to legitimacy. This is typically the case at the stage when the rules and norms are set and the cycle evolved into the stage of enforcement. As stated earlier in this chapter – based on statements from important NGO actors in the Netherlands – my assumption is, that an NGO representative would rather seek a compromise at an earlier stage of constraint satisfaction than “fight it out in court” at a much later stage.

In my research I tested the assumption that the government agency providing a mediating platform is seen as a constructive contributor to legitimacy if a form of consensus – harmonisation of plans of action based on common understanding – is reached at an earlier stage in the policy cycle. A second assumption is that an unbalanced result from the interest balancing process and legal design affects a larger population at the implementation and enforcement stage, and requires more effort to maintain consistency by the administration. A third assumption is that during the policy implementation stage, a number of cases will arise, where compensation and opportunity finding are required. Timing seems to be relevant to legitimacy.

This scale of legitimacy costs and its significance requires further research in administrative science. The significance for my research is the extent to which technology can support each stage and the appreciation of the stakeholders for such support.

The NGO chairman, who was not happy about winning 50% of the court cases argued that this type of winning did not gain a good ecological living space for birds (like an
estuary), but a fragmented set of smaller areas without much ecosystem value. He preferred alignment and harmonisation of plans in advance. Later conflicts fought out in court have a negative impact on the commitment to participate in the bureaucracy. I have found no appropriate metrics for societal costs of failed policy making or legislative imbalance in existing literature, except for the cost that are directly linked to failed projects (see e.g. the results of the Parliamentary Committee on failed ICT projects for the government, the committee Elias (Tweede Kamer, 2014). The exact deduction of other perceived societal costs are seldom made explicit and expressed into ordinal or interval scales. With this hiatus in mind, I had to choose a distinction based on the stages in policymaking. I do see justification for valuating certain effects on legitimacy higher than other effects. When a substantial proportion of the experiment population in experiment [III] sees a decrease in chances to end up in court this could be seen already as a positive impact on legitimacy. In my study I have chosen to work with 20% of the population, but this is an arbitrary percentage which may be chosen differently depending on some features of the decision in the process, e.g. its estimated impact in society, enforcement costs, scope of the policy, etc. I will elaborate in chapter [XI].

6.6 About intrusive technology and trust

Another issue concerning the relevancy of the use case for the experiment is the question of technological support when real interests are at stake. Would people accept technology based systems if this could potentially weaken their future position in the interest balancing process? Are the civil servants responsible for the process willing to risk the intervention, i.e. the implementation of a new system supporting co-creation of regulations in their current traditional system? Pushing forward some online platform could be risky for them. This is the socio-economic context challenge. Below I will elaborate on the socio-economic context from a theoretical perspective in two steps. In Chapter [II], I have argued that any scientific design test on legal service infrastructures or support for co-regulation should be validated in a real-world context for primarily two reasons, namely:

A: trust in using digital technologies for co-regulation
B: trust in technologies for stakeholders and government agents or legislators

In Chapter [II] I have addressed the concept of trust in order to make a distinction between trust and legitimacy. I will address some other dimensions of the term trust here. In the following text, I will address issues A and B. The aspects that constitute the settings for Experiment [III] will be derived from the analyses of stakeholder issues (such as trust in technology) and the use-case characteristics that can be generalised from the interviews with stakeholders like NGO chairman Fred Wouters.
Ad A) Trust in using digital technologies for co-regulation

There is a lively debate today on trust and technology in research and society. Bovenkamp provides an elaborate collection of dimensions of trust and factors contributing to trust in relation to management information (Bovenkamp, 2014).

Table 2: factors affecting trust (M. Bovenkamp, 2014).

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Factor</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics of the trustor</td>
<td>Domain expertise</td>
<td>{Lucassen:2011kh}</td>
</tr>
<tr>
<td></td>
<td>Information skills</td>
<td>{Lucassen:2011kh}</td>
</tr>
<tr>
<td></td>
<td>Source experience</td>
<td>{Lucassen:2011kh}</td>
</tr>
<tr>
<td></td>
<td>Personal capital</td>
<td>{Ye:2010dj}</td>
</tr>
<tr>
<td></td>
<td>Social capital</td>
<td>{Ye:2010dj}</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>{Ye:2010dj}</td>
</tr>
<tr>
<td></td>
<td>Authority</td>
<td>{Lucassen:2011kh, Rowley:2013fk}</td>
</tr>
<tr>
<td></td>
<td>Prepared by an expert</td>
<td>{Briggs:2002fv}</td>
</tr>
<tr>
<td></td>
<td>Objectivity</td>
<td>{Briggs:2002fv}</td>
</tr>
<tr>
<td></td>
<td>Available</td>
<td>{Briggs:2002fv}</td>
</tr>
<tr>
<td></td>
<td>Personalisation of the information</td>
<td>{Sillence:2007ff, Briggs:2002fv}</td>
</tr>
<tr>
<td></td>
<td>Verification</td>
<td>{Komiak:2004ul, Rowley:2013fk}</td>
</tr>
<tr>
<td></td>
<td>Understandability</td>
<td>{Zahedi:2008hg}</td>
</tr>
<tr>
<td></td>
<td>Reliability</td>
<td>{Song:2007gn}</td>
</tr>
<tr>
<td></td>
<td>Validity</td>
<td>{Kelton:2008eb}</td>
</tr>
</tbody>
</table>
The stakeholder dimension is a complex playing field where many elements determine trust and negotiating perspectives among the many stakeholders that can be involved in a larger use case scenario. The co-regulation of laws and regulations that influence the stakeholder negotiating position has immediate consequences that affect the stakeholders financially or environmentally or in their day-to-day lives. See also Bekkers, 2001, Zuurmond, 1996 and others, regarding the relation between the introduction of ICT and its impact on the surrounding actors. For that reason, one cannot introduce some system without complete and absolute transparency about the nature of that system and its influence on the deliberation procedures it is intended to support. For our research we can substantiate some of the potential of those systems only when the test is performed in a real life use case with real stakes involved.

For the present research, I will use the definition about trust by Rousseau (not the same Rousseau of Le Contrat Social):

‘Trust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another’ (Rousseau, 1998, p. 395).
This definition is targeting human actors but I will apply this to the use of artifacts such as the use of a website. In his dissertation on trust and transparency, Grimmelikhuijsen describes an experiment measuring the increase or decrease of trust and transparency in relation to the variable ‘information provided by government’. The use-case in his research is about air pollution near Dutch roads (with the highest car density in the world). His operationalisation of transparency is interesting. He defines three variables of trust and transparency: perceived government competence, perceived government benevolence and perceived government honesty. He then measures the relation between better or worse provision of information on policy-effects against those three variables. ‘Better’ information provision is defined again with three attributes, one of which is: usability. Increased usability is then operationalised as numbers about air pollution particles in parts per million enhanced with ‘visuals’. Those ‘visuals’ turn out to be maps (Grimmelikhuizen 2012, p.178). For our research, it is meaningful that this work about trust and transparency ends up with maps as a means for improved government information provision about policy outcome.

Figure 3: Maps as a means for increased transparency, Grimmelikhuijsen, 2012, P 178.
Surprisingly, Grimmelikhuijsen does not find a correlation between perceived trust as he defined it (perceived ‘honesty’, ‘competence’ and ‘benevolence’) and transparency based on usability (the maps) to the website. However, he did find a correlation between perceived message credibility (in the eye of the public) and the feeling of being informed. ‘The online information is perceived to be more credible if the website is more transparent (Grimmelikhuijsen, 2012, p.187). He also found a relation between perceived message credibility and perceived government trustworthiness and perceived government competence. His conclusion points at the notion of government information provision as a ‘dis-satisfier’ (Grimmelikhuijsen, 2012, p.194, based on Herzberg, 1976). This is in line with the paradigm of ‘burden reduction’ as a service paradigm as described by Hoogwout in his search for empirical evidence of the client-service-government relationship (Hoogwout, 2010, p.85). While discussing the outcomes of the influence of the usability factor, Grimmelikhuijsen also concludes that ‘transparency researchers only recently started to conceptualize and operationalise transparency’. In my research I took up the challenge described by Grimmelikhuijsen who states; [...] future research should aim to further and more comprehensively operationalise information usability as this is lacking in transparency research [...] (Grimmelikhuijsen, 2012, p.220).

The exploration above help to operationalise ‘trust’ as a concept related to technology and legitimacy. For factors contributing to trust in relation to government information, I will include those contributing elements of F. Zahedi (2008) based on the findings of Chapter [IV] and the inventarisation of Bovenkamp. These factors are chosen because those factors can be supported by technology. Those factors are:

- Relevancy for a specific situation
- Ability
- Interactivity
- Reliability
- Understanding
- Personalization
- Sufficient
- Completeness (Zahedi, 2008). These factors have to be taken into account for the choice of the use case and technologies used to support co-regulation.

**Ad B) Trust in technology by the legislator**

During our discussions with civil servants I was told several times about the sensitivity of decision making processes. The regional government has to act as facilitator in the process of solving the ‘NIMBY’ problem and they have to be completely in control of that process, otherwise they will lose their credibility. As stated earlier, facilitating deliberation is seen as part of the raison d’être of the regional authority. Any experimenting with technology could endanger or bias the policy making process and it would take decades to build trust from scratch again. This observation is supported by other theorists in eParticipation research, who advise on “an institutional perspective on the introduction of ICT’s in the context of eParticipation” (Panagiotopoulos and Elliman, 2010). ‘Beyond the policy level, there are few examples in the literature on how institutional logics have resisted or promoted the use of eParticipation technologies. In many cases, opposing views are reflected by elected representatives who have been identified as an inhibiting factor, Mahrer and Krimmer describe the ambiguous role of politicians in eParticipation institutional evolution’ (Panagiotopolous and Elliman, 2010,
If legal service infrastructures could be a technological answer to legitimacy, then the institutional perspective – that of the governmental agency that has to organise the policy making process – is relevant. The change towards transparency and co-regulation is also an issue of trust for civil servants who manage the institutional support systems in the process of balancing societal interests. All sides of the conflicting interests try to lobby and influence the process the national government not being the least of the “pushers”. The regional authority is seen as the bridge to local understanding and legitimacy, but barriers between “facilitator” and “enforcer of national priorities” are often trespassed. This brings us to issue B; trust of the legislator in the technology. Government agency credibility towards the solution is a complex dimension that relates to the role of the governmental authority as arbiter and governing body for the legal-political process. The civil servants involved in our experiments indicated that they had to be sure the system or the test would not negatively interfere with their role as governing body.

6.7 Participation and responsability

In a recent study about the change from a representative democracy towards a participatie democracy, that was assigned by the Dutch Ministry of Internal affairs, Tonkes describes an investigation in the tension between the ‘informalised Montessori democracy’ and the ‘traditional local democracy of civil servants and councillors’ (Tonkes et al, 2015). She observes a ‘juridification’ of local government, where political policymaking is replaced by informalisation and local associative citizen action groups and the traditional government role is reduced to a juridical reserve or back-up system (Tonkes, P.8, 2015). She refers to Hirst to define this type of associative action groups (associationalism’, ‘self government through voluntary associations’ (Hirst 1994: 32). For this research the question is if the digitalisation of policymaking and service providing is playing a role in this ‘informalised’ process. Sometimes the focus of design discussions of legislative digital systems seems to be on the role of those systems as a legal archive, a trustworthy back up system for all considerations that constituted to a certain decision in a certain context. The debate about the logging capabilities of the omgevingswet system in The Netherlands is a good example of this feature as back-up. Many actors stated that the digital spatial plan on the website ruimtelijkeplannen.nl is now the only source for back tracking what happened in a certain case in thepast. The digital support of co-creation is also part of that discussion, on the other hand. It seems that, while the discussion about formal versus informal policymaking processes is being intensified, the technology will play an increasingly important role in both the cases of representative and participative policymaking.
6.8. Transparency of legal systems and the digital system bureaucrat

Literature on transparency related to systems that are intended to support co-creation is rare. In his doctoral thesis Van der Hoogen addresses transparency in relation to another type of legal systems, i.e. the judicial. He proposes ‘16 principles for fair electronic trial’ that are of relevance to the topic of public trust. Principle 13 deals with the transparency of the supportive systems for judges and legal decision makers. **Principle 13: the principle of transparency**: ‘Beslisprogramma’s die door de rechter worden gebruikt ter ondersteuning van de beslissing, dienen actief openbaar te worden gemaakt door publicatie op het internet’. This translates as: ‘decision support systems that are used by the Judge to support the decision making process should be actively made public and transparent by publication on the internet’. His reason for this principle is that interpretation of laws and regulations could be made by those system in hidden ways or by unauthorized people, like designers and programmers (van den Hoogen, 2007).

Although van den Hoogen concentrates his ideas on the role of the court itself, it can be argued that the issue of trust in technology and the increased need for transparency can be put in a broader perspective.

In the discussions with the regional authority officers about the design of the online spatial planning consultation system during the research, I found that the transparency requirements involved with digitalisation of the legal arena sheds a new light on the issues that ‘street level bureaucrats’ have to deal with. This term was introduced by Michael Lipsky (Lipsky, 2008, Zuurmond, 1996). This ‘new breed’ of civil servants, who perform the painstakingly meticulous job of translating broad policies into concrete do’s and don’ts on the internet, are becoming very well aware of the risks they take by putting all those micro decisions on the internet. Where an old fashioned service-counter civil servant could be as inconsistent as he or she pleased, in the world of online maps, the maps with coloured

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123 This is called ‘discretionary power’
areas allowing for very easy comparisons, any inconsistence or leap of interpretation could become obvious and make these civil servants directly vulnerable to criticism and legal claims against government. It is not easy to explain all the policy and balancing considerations when these nuances are simplified in color schemes on a digital screen.

The categorisation of use cases out of our digital mapping example and the correspondent ‘go’ or ‘no-go’ jurisdictions (area’s represented by colours on a map) require knowledge and implied simplification of reality during the design stage. So, on the one hand those designers have more power to influence decisions based on their interpretation of the legal apparatus, and on the other hand there is the potential of more transparency, since everyone can see the outcome of the system design. This potential as counter-balancing power is stronger when the design of the system is visualised on the Internet. In current practice, the street level bureaucrat is replaced by ‘the system level bureaucrat’- the one who designs the decision models for computerized systems that do decide about citizens’ prohibitions and allowances (Bovens 2000, Bovens and Zouridis, 2002, Zuurmond 1996). Bovens and Zouridis provide excellent insights in the consequences of such a change in the way our administration works: […] ‘The system designers, legal policy staff and IT experts are to be regarded in particular as the new equivalents to the former street-level bureaucrats. By this we mean that they are the persons whose choices can impact the practical implementation of a policy. These system-level bureaucrats have the discretionary power needed to convert legal frameworks into concrete algorithms, decision trees and modules. They are constantly making choices: which definitions should be used, how to define vague terms, what processes are to be how designed and interlinked? They are therefore, just as the street-level bureaucrats were in their time, no docile policy implementation robots, but themselves policymakers’ […] (Bovens & Zouridis, 2002).

Building on the work of Bovens, Zouridis and Bekkers, I conclude here, that, in order to be a support for legitimacy, the design of any legal service infrastructure should be subject to specific measures of transparency at the design stage. Lipskys’ statement that ‘policy implementation in the end comes down to the people who actually implement it’ should perhaps be replaced by: ‘digital policy implementation in the end comes down to people who actually design the system’. In Chapter [XI], based on interviews with regional professionals in electronic legislation design, I will provide a number of recommendations for this design stage.
6.9. Co-regulation and iterative design in an action research setting

Since I am investigating co-creation, co-regulation and the role of ICT design, I have chosen to follow an iterative research approach that matches the research object. This study of the potential role of technology in policymaking process is very difficult to carry out from a positivistic stance as impartial observer. The approach has to be iterative because of the following reasons:

- The set-up of technology that has to be tested in any realistic experiment cannot be designed without close collaboration with the owners of the policy making process.
- The translation from hundreds of paper-based policy documents into the digital versions of any policy-making outcome variant cannot be designed without close collaboration with the legal and spatial domain exerts.
- The ‘look and feel’ of the front end cannot be designed without an intense discussion among a multidisciplinary team of experts iterating a range of possibilities and user views.
- The design of the ICT service infrastructure cannot be meaningful without an alignment with the ICT experts of the legislative authority.
- An iterative approach is better suited to deal with contradicting demands, which is typical not only for the process of balancing interests, but also for the process of balancing contradicting design specifications.

6.10. Conclusions conceptualisation of co-regulation

My research poses the question of whether the ‘legislative prosumer’ has arrived or will arrive soon. The question of legitimacy of law might be approached in new and (co-)constructive ways, enabled by new technologies with more emphasis on the responsibility of citizens and business, rather than with the government. I will argue that this might be the case, but this success will be largely dependent on the availability of an infrastructure with enough sophistication, like maps, in-built argumentation, prioritization, assessment support and semantic standardization to meet with the requirements that answer to all those factors mentioned above.

There are a number of tools that support policymaking and co-regulation. It is apparently difficult to test those in empirical situations. The link between co-regulation and the use of mapping technologies has been made in PPGIS. The issue of trust and technology and the involvement of ‘real’ users and participation metrics appears to be a dominant issue
in that research area. Co-regulation and eParticipation appear to have ‘joint prioritization and interest balancing’ in common, where co-regulation could be defined as participation with more responsibility for the balancing of many interests and the legal effect. The element of trust plays an important role. An inventory of relevant factors was offered by Bovenkamp in the table shown earlier and was operationalized by Grimmelikhuijsen (2012). His findings indicate transparency as a ‘dissatisfier’ in relation to trust. The staging or timing of the joint prioritization during the legislative process could be relevant for my research. Technology support could be different at different stages of the joint prioritization. I conclude that Senden does touch on the same issues as those addressed in this dissertation, and that many of the criteria (good governance, transparency, representativeness, cost effectiveness of administration, sustainability, and involvement of civil society) are very similar to the criteria about eGovernment services mentioned earlier. Senden looks at the aggregation level of Europe and not at the regional level we are aiming for. However, she does not provide a proof of its effect and she hardly touches upon technology support for legal co-regulation. While she was also working on environmental dilemma’s, issues and regulations, she never applied her theory to Spatial Planning, the domain I have chosen to test the relationship between technology, legitimacy and law.

6.9.1. Conclusions conceptualisation of co-regulation and legitimacy

Definition of co-regulation

As co-regulation, I define a situation where citizens are taking responsibility for the design of legislation that set norms, priorities and constraints for fellow citizens because this would indicate a reversing or a modernisation of ‘Le Contrat Social’.

Technologies for co-regulation

I focus on those technologies that contribute to ‘the harmonisation of plans of action and common situation definition’. Particularly, I need to address the needs at the stage where planning is not fixed and alternatives are still ambiguous. The technology used shall have to facilitate the process of harmonisation among stakeholders of a conflict of interest with a spatial dimension in a context with pluriform legal constraints. I limit the investigation to the spatial and physical domain. I have found that PPGIS is a promising line of technologies. However, the design should focus more on the permanent legal service infrastructure that supports eParticipation. Empirical research beyond interface usability, metrics and quantitative data on numbers of participants appears to be lacking. Carver has pointed at the explorative nature that GIS technology should support. This combines well with the notion of a joint cognitive process of a group of actors in attributing the status function ‘responsibility’ to government and other actors as Oosterhout has described (Oosterhout 2002). The plan should not be fixed in
paper. The digital technology can provide alternative – and more dynamic- means for harmonisation of plans of action that contribute to the ongoing legitimising process as described by Oosterhout (see appendix for a detailed perspective of responsible according to Oosterhout).

Stages for co-regulation

There is evidence that different technologies could contribute at different stages of the legislative cycle from drafting to evaluation. Contributions to increased legitimacy by co-regulation may also be valued differently at different stages of the process by the stakeholders. There is evidence that contributions at an earlier stage are valued higher than those at a later stage.

Trust and co-regulation:

Trust is one of the elements that contribute to the role of technology in supporting law. A number of factors have been identified that improve trust of the stakeholders in the co-regulation process. For government information, these factors are: relevancy for specific situation, integrity, ability interactivity, perceived reliability, understanding of the process, personalization, sufficient information, completeness (Zahedi, 2008). In order to achieve the required level of trust in the legislator during the co-regulation process, there is a need for transparency. This transparency does not necessarily improve the level of trust, but the lack of transparency does decrease that level.

In order to be a support for legitimacy, the design of any legal service infrastructure should be subject to specific measures of transparency at the design stage. I assume that this need for transparency increases when the co-regulation process becomes more complex.

Research on co-regulation in a living lab setting:

Given the iterative character of co-regulation and given the iterative character of ICT design, I chose the Living lab approach for Experiment [III].

Consequences for the use case and Experiment [III]

Experiment [III] therefore incorporates a wider range of research activities than testing tooling with a group of respondents. In the next chapters I will explain Experiment [III] in greater detail.

For the set-up of this experiment I addressed following questions;

1. What are the characteristics of the use case?
   a. What makes it a representative use case?
2. What has to be done to gain trust among the owners of the policy making process?
   b. What can we derive from this part of the research about the governance of technologies?
   c. What are the ways to study them?

3. What has to be done to model the policies and the legal content?
   d. What can we derive from this part of the research about legislative content modeling?
   e. What are the ways to study them?

4. What has to be done to design the service infrastructure?
   f. What can we derive from this part of the research about the technical design process?
   g. What are the ways to study it?

5. What has to be done to test the actual service potential?

6. What is the impact of the tooling for the ‘client organisation’?

7. What are the implications for the research claim about the potential role of technology and legitimacy?

In Chapter [VII] these questions were used as a basis for designing the test of experiment [III] and the validation requirements.
VII:

A Living Lab:

defining the use case and the legal content modeling
In Chapters [II] and [VI], p. 133 and 154, I have argued that the reality test should be part of the design question. If I argue that a design test should be ‘realistic’, it should involve a use case that is governed by a real team of civil servant policy makers and experts seeking to support the policy-making process as well as they can. Under those ‘real circumstances’, the use case has to be relevant for the validation of our theory, the interests at stake should be significant, and the authority involved should have the overall jurisdiction. This aspect regarding high stakes is described in detail by Grimmelikhuijsen (2012) in his work about trust. Grimmelikhuijsen (2012, p. 136) addresses the concept of ‘vulnerability’ in relation to experimentation and scientific methods regarding trust and information provision. The actors should be vulnerable in order for the experiment to be meaningful. As defined by NGO chairman Wouters, the problem indicated the need for a participative technology for co-regulation. The design solution of the legal service infrastructure as described earlier seems to fit these needs. To test this fit in a perception experiment carried out among real stakeholders, I will firstly describe how I have operationalised the theory and ideas about policy making given by regional authorities and moderators by turning them into use case attributes for Experiment [III].

From theory and from our conceptualization described in the previous chapter, I identify a set of case attributes that will be included in the use case representing co-regulation. This use case forms the basis of Experiment [III]. The case attributes identified are:

1. **Political risks**
   1.1 Operationalisation: Public authority with political responsibility indicating risks.

2. **Representative case for significant problems in spatial planning**
   2.1 Operationalisation: Representative in perception of stakeholders

3. **Complex interest-balancing act (Nimby-type)**
   3.1 Operationalisation: complex as perceived by participants
   3.2 Operationalisation: complex in pluriformity of legal constraints

4. **Complex in legal ambiguity**
   4.1 Operationalised as: existing history of legal court cases
   4.2 Legal pluriformity in view of all stakeholders

5. **Ambiguity in evaluation metrics**
   5.1 Operationalisation: difficult to explain nuances and evaluation to constituency in view of participants

6. **High conflicting interests**
   6.1. Operationalisation: High stakes in terms of money or large constituencies involved

In Experiment [III], I will focus on these case attributes and they will be used as the basis for the questionnaires of Experiment [III]. I have set up the legal analyses of the relevant use case and the design of the supporting technology as an iterative process, allowing the stakeholders to give their feedback on the supporting system during its development and using user experiences for deciding on its features. In fact the entire process of creating the support system for co-regulation evolved naturally as a co-creation process itself.
To capture the ideas about technology for co-regulation of the experts and problem owners in the regional authority, I applied a method called the ‘Living Lab research approach’. A version of this co-creation approach was already practiced by the regional authority while engaging in paper-based ‘poster sessions’ and consultation workshops as described in Chapter [VII]. The Living Lab approach is a natural extension of those consultation workshops, but also respects the notion that very few sophisticated technologies have been accepted in the legal domain: “Noticeable is also that several contributions in the field of Artificial Intelligence and Law appear to be incompatible with respect to the understanding of the law and legal work. It is no secret that very few systems have been accepted by the legal community. The problems, however, are not preliminary of a technical nature. With little doubt the difficulties are more closely related to a too shallow understanding of the requirements of the domain taken as a whole” (Walgren 1993 in Casellas, 2011).

The Living Lab research method may support ‘the understanding of the requirements’ and ‘the acquisition of conceptual domain knowledge’, as it is also called, in a much more comprehensive manner and uptake of the technology could be easier if the practitioners themselves are involved in the design.

7.1. Some methodological considerations about Living Lab research

As stated before in order to understand the issues at hand and demands for a supporting environment for co-regulation the stakeholders involved should play a major part in the entire design process. This would also mean that I couldn’t do my research in a somewhat value-free manner nor could I remain distant. This approach as a scientific method has been introduced by Kurt Lewin (Lewin, ’48), who promotes this idea particularly in changing complex social contexts. Lewis calls this form of qualitative research ‘action research’. Markopoulos (2000) defines action research as follows: “Action research is a cooperative effort among individuals working with others in teams or communities searching for solutions to everyday, real problems. Ideally it is characterized by an environment in which: the knowledge obtained can be immediately applied, the researcher is involved and the research is a typically cyclical process linking theory and practice. A key assumption of action research is that action brings understanding and insight. An important aspect of living labs is the creation of rapid learning cycles that accelerate the innovation process.” (P. Markopoulos, 2000).

Action research is not the same as case study research, where a number of cases would have been evaluated to identify a pattern. I could have chosen a case study approach where actors were asked to rate the influence of technology and their estimation of that role on legitimacy. Alternatively, I could have set a benchmark with variables at 2004 and investigated if the technological developments would have influenced the legitimacy of policies
and the legislation in 2010. Because of the history with the design of www.overheid.nl, the option of case study research was too remote. I had doubts that an improvement of the legal service would occur without actively taking action. It was also clear that legal service design was unknown territory where little was known about the variables involved and less was known about the relationship with legitimacy. A case study is not a collaborative design action, where the researcher is one of the chief designers of the solution that is to be tested.

For Experiment [III], in search for a solution for something that the legislators perceived as a problem, I opted for ‘teaming up’ with some of the main actors in 2005. Together we defined a range of projects (Geogov, Geopolis, Feed, DAO omgevingsvergunning, botsproef) to engage in that quest. I will describe some of those projects that are relevant for the purpose of the research. The main reason for that choice is that after addwijzer and Legal Atlas, we had the common conviction that digital maps could support that legitimacy challenge.

The action research design of an experiment acknowledges that the researcher is involved in the experiment and he and the actors have a common goal of developing a solution for real-world problems. The claim that technology can support legitimacy is not taken from the remote position of the impartial observer. There is an interest in designing the technology that may result in improved legitimacy and actors who validate the technology have a stake at guarding their interests. The methodological consequence of this action research approach is that a range of validation issues occur. The researcher may have an interest or a bias towards a positive interpretation of the results; ‘the expectation Bias’ (Colson, 2012, P95). The experiment may be designed in a biased way and people know they are part of a research activity: ‘demand characteristic Bias’ (Colson, 2012, p. 95). Another consequence is that repetition of the research with the same variables is difficult. The next researcher cannot easily repeat the same circumstances to falsify the results. Also this may make it more difficult to generalize the conclusions to other contexts.

The action research approach is sometimes called a ‘flexible design experiment setting’ as opposed to a ‘fixed design experiment setting’, since the design is evolving, multiple realities can exist and are presented with a focus on participants’ views. Colson (2013, p. 141) calls this type of study a pilot case study method. Typical for action research is that the organisation that is studied has the lead in the design process. In the co-regulation case I had to take a much more leading role. A Living Lab research approach seemed better suited compared to the action research approach. In this living lab I combine the development of iterative policy-making methods with ICT development, (see figure 1 on the next page).

The Living Lab research approach (LLRA) is a user-centric research method for sensing, prototyping, validating, and refining complex solutions in multiple and evolving real-life contexts (Eriksson, Niitamo & Kulkki, 2005). This research method is defined as an experimentation platform used for executing and testing various research projects, such as socio-technical innovation development. The aim of living labs is to use the natural environment of the user (real-word settings) to obtain high-quality research data and to ensure that
the findings do not deviate from those which would be obtained in the real world. Moreover, this method acts as an instrument for measuring the effectiveness of innovation in different environmental, social, and cultural contexts. As Erikson and co-authors (2008) put it: “Living Labs are user communities corresponding to real life settings, which have been mostly used in the last years by high-tech companies for validating new technology applications in real end-user environments. In addition to the inherently associated technical testing, the gathering of feedback on the perceived relevance of application functionalities, their usability, additional end-user requirements, etc. constitutes, among others, the expected insight on the human dimension of technology, which is of paramount importance for a successful societal deployment of new technologies.” (Eriksson et al., 2008).

Figure 1: Two perspectives leading to the same type of research method, see Chapter [XI].

Livings labs are categorized into four types: utilizer-driven, enabler-driven, provider-driven and user-driven (Leminen, Westerlund & Nyström, 2012). See figure 2.

Figure 2: Living Labs as open innovation ecosystems (Leminen & Westerlund, 2012).
Some authors (e.g. Allen & Stedan, 2011, *table 1*) make a strict distinction between action research and living lab research. Such strict distinction however is somewhat arbitrary, in my view. It is more important to distinguish living lab research and the experiments under controlled conditions or traditional lab experiments.

**Table 1: Comparison of research approaches (Allen & Stefan, 2011). Introduction to the living lab approach.**

<table>
<thead>
<tr>
<th>Lab research (user labs)</th>
<th>Action research</th>
<th>Living lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controled environment</td>
<td>Real world setting, yet typically confined to an organisation or department</td>
<td>Real world setting, involving multiple stakeholders from multiple organisations and their interactions.</td>
</tr>
<tr>
<td>Limited, clearly assigned role of users</td>
<td>Not specific about user role</td>
<td>Active role of users as co-innovators; exposing technology to the creative and destructive energies of the users; facilitating dynamics of collective action.</td>
</tr>
<tr>
<td>Designed for replicability</td>
<td>Active (social and political) role of researcher in the research setting</td>
<td>Multi-disciplinary research teams actively involved in the research settings, confronted with the technical, social and political dynamics of innovation, at times even driving the agenda.</td>
</tr>
<tr>
<td>Designed for observation of outcome</td>
<td>The researchers observe and take part in the creation of an outcome</td>
<td>Joint collaboration to create a desired outcome.</td>
</tr>
</tbody>
</table>

A number of authors have written about living labs to co-create public services. For instance, Mulder (2012) suggests the following: “By ensuring participation of the crucial partners, a sustainable infrastructure has been created to co-create public services and foster further innovation with public sector information sharing. The case example demonstrates that co-creation can also lead to the development of better public services, with citizens and the private sector contributing data by means of crowdsourcing, and it paves the way for more co-creation through open service development .” (Mulder, 2012).

Molinari (2011) describes three key findings with other spatial planning eParticipation experiments where a living lab approach proved to be fruitful: “Further to that, the PARTERRE pilot experiments demonstrated good potential of the Territorial living lab approach (Marsh 2008) for spatial planning and environmental assessment in three key dimensions:
- Living lab partnerships allowing to improve citizen participation and stakeholder relationships and leading to greater ownership of planning outcomes and thus smoother implementation.
- Living lab co-design processes allowing to address innovation needs in planning processes where they emerge, particularly in the integration and prioritization of stakeholder interests.
- Living labs being complementary to eParticipation tools and methods for planning processes, leading to an integrated PARTERRE service concept, covering the entire planning process and its iterative cycles.

The outcome has been a deep integration of the Living Lab approach into the PARTERRE service – taking advantage of Living lab partnerships to consolidate service outcomes – in order to envisage a framework for future professional delivery. (Molinari 2011).

Also other authors have described a living lab research cycle a practice that has been applied in various research contexts (see e.g. http://www.openlivinglabs.eu/node/125).

7.1.1. A Living Lab framework

As stated above, to substantiate the claim about technology supporting legitimacy a pre-test – post-test multiple control groups design like with Experiment [II] is not really required. The goal is not to test a specific tool, like in experiment [II], but the likelihood that such technologies would support discours during policymaking.

Schalberg describes an entire methodology for ICT design in a modern setting: She quotes Wiberg (2005) to describe the challenge that drives this development: Today, IT systems also are used as means to interact continuously with other individuals and systems, and to facilitate human mobility in a ubiquitous manner. The expansion and alteration in the usage of IT systems also can be noticed in the global impact of IT systems focusing on social networks such as Facebook and Linked In, and the use of mobile phones. Based on the above, it can be concluded that while traditional IT systems focus on supporting organizational processes, new IT systems need to focus on supporting social contacts and interactions in people’s everyday lives (Wiberg, 2005, p. x).

The living lab approach seems the best research method to match the needs of my research on co-regulation. Given the wide support for this approach, I have chosen for the Living Lab research method. The Living Lab set-up was framed within the European eParticipation project ‘Feed’124, the Dutch National Geo-information project ‘Geogov’ 125, and the Flevoland project ‘Geopolis’ 126 (see figure 5 on page 281). In Chapter XI, I will reflect on the

125 http://www.rgi-otb.nl/
126 http://www.ipo.nl/publicaties/verslag-van-de-volgende-ronde-flevoland/
experience using this approach.

Figure 3: Botnia Open Living Lab methodology for ICT development in Europe sparked by the Finish European presidency \(^{127}\) (Stahlbrust, 2009).

\(^{127}\) http://www.openlivinglabs.eu/node/125
7.2. Research plan of a Living Lab on co-regulation

The iterative (Living Lab) approach is framed towards a number of research steps:

1. **Choosing the policy-making use case.**
   a. Analysing the use case, its context and its history, leading towards an understanding of the policy-making environment that meets the requirements of the user case attributes as listed above.

2. Analysing the policy-making process that produces the legal content.

3. Analysing the moderation process and the balancing of interests and practices, leading towards an overview of moderator needs.

4. Investigating the relevant legal content knowability issues, leading towards content management needs.
   a. Gathering content and content categories.
   b. Inference of relevant content into a model.
   c. Content modelling and mapping into policy making technical support.
   d. Content visualisation in a portal for end users.

Together, these research steps will lead to a technical support design for the use case and a test design for the focus group test. For the last research step I consequently have chosen a constructivist approach:

5. **Creating a technical infrastructure that supports that production process.**
   a. Moderation support technology
   b. Infrastructure design to align with regional authority systems.
   c. Technical visualisation support

This Chapter will address lines 1-4. Chapter VIII will address the construction of the solution of step 5. Chapter IX will describe the focus group test. Chapter X will draw conclusions.

7.2.1. The Living Lab on co-regulation (including experiment III)

The experiments on co-regulation took place in the province Flevoland with a mixed team consisting of represents of the province and the GEO-polis project team. The Living Lab team consisted of the following staff:

- Team manager  
  Mary Haselager (Flev)
- Legal design  
  Jolanka Perk (Flev)
- Geo-design  
  Jan Schilder (Flev)
The participants of the living lab had frequent meetings and discussions setting the dynamic agenda and addressing the issues to be solved in the living lab setting. The following activities were conducted, amongst others, during the roughly three years that we worked together on the project:

- **Exchange of informative documents about normal practices**
- **Exchange of design versions of digital replacements**
- **Participation in consultation workshops**
- **Participation in TMIJ workshops (toekomst Markermeer/IJmeer, i.e. the future of the region Markermeer/IJburg)**
- **Project meetings**
- **Test design sessions**
- **Test sessions of prototype and portal**
- **Evaluation sessions**
- **Design sessions of the production website of Flevoland**
- **Design sessions organised in collaboration with the National Ministry**

*Figure 4: Geopolis Flevoland: the intention of increasing legitimacy of policy making using maps.*
The sessions were recorded in mail, in minutes, and in documents, but mostly in agreed software and interface designs.

7.2.2. Validation with the Living Lab research

There is a need for explicit statement about the position of the researcher. The researcher could be a paid consultant to evaluate the outcome of the tests. The researcher could be a paid software developer that had an interest in acceptance of the technology. For the purpose of validation, there is a need for a detailed description of the context and the use case that allows external critical reflection for that reason. To reduce the bias, there is also a need for a ‘mixed research strategy approach’ (Colson 2012, p.132), such as triangulation of a mix of quantitative approaches and qualitative interaction sessions. During the research and design stages, there is a need to reflect on the outcome and explore the potential indicators of negative cases. For the qualitative part of the experiment, I follow an iterative and cyclic approach of questioning, discussing possibilities, and producing technical designs and legal interpretational (inference) models, which are then again discussed and questioned by a team of experts and owners of the policy making process (legislators).

The validation method that I have conducted in the living lab experimental environment was a mix between pre-design validation, qualitative tests, and post-design validation. The following tests were performed:

1. Pre-test validation on agreement on the technological design, the willingness to risk using the technology in real policymaking situations and agreement on legal content management interpretation.
2. Pre-test technical validation in the form of a feasibility tests.
3. A qualitative test among a focus group of relevant actors.
4. Post-test validation by studying the uptake that shows from the follow-up activities of the actors and their peer groups to implement the technology after the proof-of-concept. The peer group is relevant since the experts involved may become so engrossed in the design process that they grow biased ‘about their baby’. Colson states that describing the audiences is a vital part of a case study approach (Colson 2012, p.241, p.158).

5. Triangulation of the results with documents and the quantitative piloting test (Guion, Diehl & McDonald, 2011).

6. Studying the audit trail of meetings, email, designs, models, and working software applications.

For the qualitative test in the experiment, I applied a ‘non-random pre-test – post-test single group design’. Colson (2012, p. 110) indicates that such a test can be a part of a wider study and as a pilot for further experimentation.

The limitations of this approach are partially caused by pragmatic reasons, on the one hand, and a matter of trust, on the other hand. It is difficult to put influential actors in a living lab condition and treat them as guinea pigs in a cage, so to speak. It is also difficult to expect high interest actors to apply a co-regulation tool in the stage of highly-tensed negotiations about conflicting interests, when they see the technology for the first time.

7.3. [1] The living lab use case choice, use case analyses and development

Following the use case attributes listed at the beginning of this chapter in the paragraph above, as well as for pragmatic reasons, we have chosen INSPIRE as the use case. This case included a legal processing practice of the province Flevoland. The case, was considered representative for large spatial planning operations involving multiple actors representing different interests and a complex legal design problem balancing those interest. This particular case involved stakeholders debating a large investment of 60,000 houses in a Natura 2000 protected area (this debate is called ‘De Schaalsprong’ see also figure 6). It should be noted that a less scientific but a very pragmatic reason was that this regional authority was flexible enough to contribute to the Living lab approach and was willing to engage in lively discussions about use case context, technical design, implementation, and testing. The Province also allowed for some experimenting in their political facilitation role.
Figure 6: Schaalsprong: simulations of 60,000 houses in the Markermeer (source: zeeburgnieuws).

Figure 7: Showing the economic driver: the winning of sand. This will have to be compensated sufficiently with ecological measures.
7.3.1. History of the use case of Experiment III

The real life situation we chose to work in for Experiment [III] concerns one of the most debated areas of the Netherlands: the IJsselmeer & Markermeer. This is the area where the seas used to flood the Netherlands every 50-75 years or so. Somewhere in the second half of the 20th century, the work – which started in 1255 with the creation of the first Dutch Water board – was finished: the IJsselmeer was tamed into a calm inner sea. Two large new island regions were then hand-made out of the mud:

Figure 8: Old picture of the Ijsselmeer (IJssel lake) area, which changed many times due to floodings, 1739.

The Flevoland polder and the Noord-Oost polder. Flevoland became a real province and legislator in 1985, while Noord-Oost polder stayed a part of the province Overijssel until 1962. Inspired by the success, plans were made to increase the size of the amount of dry land in those regions with more islands (see Figure 9).

The drying of the southern area (inpoldering in Dutch) shown in figure 10 was stopped due to the considerations new to the governors: protecting the environment. It had taken a while for the Dutch to realise that they were not fighting the sea anymore. Accidentally, they had created the second largest sweet water reservoir in Western Europe and many pressure groups wanted to keep it open. See, for example, the campaign “Keep the IJsselmeer open” that was launched in 2009 by the Royal Dutch water recreation Society (watersportverbond)\textsuperscript{128}. Many legal authorities have been involved with the area ever since, with different policies and goals in mind. The truth is that the management and the planning of the area has become a constant, structural balancing act.

The Investigations in the area have produced cubic meters of reports in any given year. Another example is the 2013 report of the pressure group ‘Het Blauwe Hart’\textsuperscript{129}. As

\textsuperscript{128} http://www.watersportverbond.nl/Content.aspx?cid=1&sid=1&cid=1&sid=1

\textsuperscript{129} http://www.hetblauwehart.org/actueel/nieuws/228-politici-word-wakker-het-wordt-tijd-omanders-te-gaan-denken-om-geldverspilling-te-voorkomen
shown in figure 9 @ 10 below, in the end, only the right-bottom land area has actually been realized as dry land. The left area has been kept open after the dike to protect the whole area as dry land, connecting Lelystad to Enkhuizen, was put in place. This considerable change in planning resulted in a complex ecological and economical problem. It is here that we start our use case for Experiment [III] with the technology for the support of co-regulation.

Figure 9: Planning as intended for poldering: the bottom-left has been realized, the left sides have not.

7.3.2. The INSPIRE pluriform legal regime

For the use case of Experiment [III], I have chosen this area also because it falls among the INSPIRE annex III, layer 11 and 18 regimes; areas with legal constraints, regulated areas, and habitat/Natura2000 areas. Figure 11 depicts the Natura2000 map layer that used to be a part of the digital information provision infrastructure of the region. The restrictive Natura2000 legal regime is represented by green vertical stripes covering the entire Markermeer and IJssel Lake. (See figure 10 on the next page).

Note that this is a legally binding INSPIRE-regime: neither actions, nor business activities or building activities can be performed here without proper compensation and countermeasures, legal hearings, and high risks of penalties. The legal regime contains many rules that allow hardly anything: no business, no housing, no infrastructure, recreation, and so on. On the other hand other rules, conflicting with the first rules force parties to take all kind of actions. Obviously the complexity of the regulation and the interests of the stakeholders involved made it quite difficult to decide on the right actions to take, fitting the regulations on one hand and balancing the interests on the other. The Lake Markermeer requires numerous ecological measurements to save the area from further deterioration from the lack of oxygen. This is required by the European Water Directive on the same legis-
relative level. The water ecology is suffering from sludge deposits that create uninhabitable murky waters. The sludge is a side effect of the old dike that was supposed to protect the land that never came into existence. Everyone agrees something has to be done (although not allowed by any one legal regime). At the same time, the already stressed ecological balance of the region is even more threatened by the obligation to host another 60,000 houses with accompanying recreational and transport infrastructure. Almere, the largest town in Flevoland serves as over-flow city for the Metropolitan area of Amsterdam that has had a population growth problem for years. The need to provide transport infrastructure and housing for all those families whilst maintaining an environmentally friendly image at the same time is a high risk arena for politicians and facilitators of the policy-making processes. Calling the region “locked under Natura2000”, a citation used in many media as indicated by the map layer with the green stripes in figure 10, is a simplification of the complex world that would needlessly bring organisations and people into the court room.

Figure 10: Digital map indicating absoluteness of the Natural 2000 regime; Digital plan Flevoland website Flevoland “omgevingsplan” the legally binding structural spatial plan, 2008.

These early digital representations undermine the legitimacy of our legal system, since two contradicting legal regimes (Water Directive\textsuperscript{130} versus Natura2000 protected Sites under the Habitat Directive\textsuperscript{131}) have norms with partially conflicting demands, while, at the same time, something has to done to provide space to the societal problem. These

\textsuperscript{130} nr. 2455/2001/EG and 2008/32/EG
\textsuperscript{131} http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm
contradictory (and pluriform) findings about regulations and the search for the appropriate balance of interests are relevant for our use-case Experiment [III] setting. Over the years, the Dutch regional authorities have developed a complex set of brainstorm sessions, explorative sessions, feed-back sessions, searching sessions, ‘zienswijzen’ or perspectives, decision procedures, and protocols to guide the policy-making processes about this type of challenges. These sessions were traditionally paper-based, using large amounts of drawing-paper folders, paper maps, and resulting in 250-page consolidated policies and norms in paper books and guidelines. The paper technology is now gradually being replaced by simulations and websites. Unfortunately, these processes failed to serve the purpose of an integrated approach according to both the NGO’s and the Province of Flevoland Holland. There is apparently a need for digital visualisation of ‘negotiation space’ beyond the strict or simplistic digitalisation of European directives (see figure 10). This is a design challenge for the research. It is the challenge to support co-regulation.

The problem as described above is not limited to the Dutch authorities. In the context of the European regulative Framework INSPIRE and the environmental regulative framework of the Habitat Directive, the Natura2000 sites and the Water Directive present an interesting problem arena that creates many challenges for the European governments. In 2006 INSPIRE stated not only what environmental indicators have to be measured, but also how these environmental indicators should be measured. It is a digital enforcement instrument and an information provision instrument in one. As a consequence, INSPIRE has implications for all European governments, since it has impact on all future European spatial plans, safety measures, permit systems, cable networks, etc. It appears that many times the visualisation of map layers for environmental purposes, like with INSPIRE, creates a legal challenge; the feeding time of geese in the Netherlands is six months at most. Then they fly back to the North. The map (see figure 11) showing the areas that are protected for the sake of the geese should convey the temporal factor of a six month period.

Figure 11: Blue contours indicating protected habitats of Ducks and Goose, Ministerie of VROM, 2008.

132 A zienswijze is perspective on the case that has been formally stated in the policy making process by a stakeholder.
Including temporal or seasonal factors is unusual in legal constraints mapping, however. Experts use such inadequate mapping in their scientific reports to support a side of the argument between contesting pressure groups. The visualisation appears to be much more restrictive than the policymakers intended to protect the geese. Technology could become a weapon in such a case.

“De overheid staat onder druk om zich enerzijds aan te passen aan een veranderende samenleving en anderzijds moet ze zich houden aan de regels en wetten die worden opgelegd door de rechtsstaat” (WRR, 2004, p. 10).

Translates as: “The Dutch government is under pressure to adapt to a changing reality from one side and to adhere to the regulations and laws imposed by the State of Law (Dutch Scientific Advisory Council)”.

The NGO-groups involved in the protection of birds and those involved in building the infrastructure have faced each other in court for the last 20 years in the Waddenzee and the Westerschelde in ‘legalistic battles’, where each side tried to convince the court that a particular interest has been totally neglected or vastly undervalued. The chairman of the bird protection stated that the legal process in the courtroom does not help ‘his’ food chain to develop in a natural way. He indicated that the pressure groups require a process that provides more insight and understanding in each other’s negotiation space before going to court. There are examples of cases mentioned by the moderators where recreational agencies went to administrative courts for four times when they failed to understand the intentions of the policymakers. These incidents could have been prevented, if the intentions of the policymakers had been better understood earlier. The small blue areas (see Figure 11 on page 128) are protected breeding areas for geese from the Ministerial website of The Ministry of Spatial affairs (then called VROM) in 2008. In reality, these marked areas may well shift a few mi-les in each direction, depending on the best trade-off in view of the NGOs involved. The visualisation using limited digital technology or paper suggests a more restrictive situation. A more flexible design of the relation between the blue contours on the map and the legal constraints these represent would actually much better support the policy intention. The expert reports required by law for any permit request often contradict each other and create ambiguity as the reports could all be right. The legal system is yet incapable of mapping ecological and economic constraints in such a way that the expert reports have a single point of reference. One has to be expert oneself to see the gaps in the line of arguments.

INSPIRE is a good example to illustrate the necessity of transparency and open discourse requirements as set by Habermas and stated earlier. The INSPIRE European regulatory framework is highly complex. There are many interests at stake and all ambiguity can be used to lobby one of those interests. Many of the interests have the NIMBY character: no-one wants forty 210m high wind mills in their backyard, while many agree that we
should produce more wind energy. In the town of Medemblik (see figure 13), the windmill has become a symbol of legislative fraud because the 210m tall solitary Mill was given the designation ‘Windpark’. The civil servants were accused of illegally bypassing of the normal regulations\textsuperscript{133}.

Figure 12: Wind mills in and around the IJmeer as an example of the Nimby problem.

No-one wants 60,000 houses in their sailing areas either, but everyone wants to own a private and affordable house. Balancing interests and rational constraint analyses are often biased by the discussions about the semantics or interpretations of cause-and-effect chains. INSPIRE, the Habitat- directive, and similar European directives are the levels in the pluriform legal source regimes that affect areas like this region of Flevoland.

The biggest problems with European standardisation efforts like INSPIRE for the Dutch regions are those standardisations that concern the harmonisation of legally binding calculating methods behind the rules.

Figure 13: Medemblik Wind Mill\textsuperscript{134}.
Be aware that this picture is not photoshopped!

\textsuperscript{133} http://www.volkskrant.nl/vk/nl/2680/Economie/article/detail/3592674/2014/02/08/Topbankiers-verdienden-miljoenen-met-windmolen.dhtml
\textsuperscript{134} http://www.medemblikactueel.nl/oproep-tot-protestbijeenkomst-wieringerwerf/
7.3.3. INSPIRE mappings for Dutch regional authorities

In 2009, I co-wrote an impact analysis for INSPIRE commissioned by the Dutch Provinces (Hoogwout, Peters & Woudenberg, 2009). This impact analysis report mentions several ambiguities with the new infrastructure, starting with the definition of ‘Protected Sites’ according to the International Union for the Conservation of Nature (IUCN): “A Protected Site is an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means”.

The scope of this definition of ‘protected sites’ does raise a discussion among policy advisors on how to wisely apply the INSPIRE directive. If too many ‘protected sites’ are defined, this tends to weaken the power of enforcement strategies and reporting to Europe may become complex and tedious. If too few areas are being designated as ‘protected’, the regional authority will lose the ‘sites’ it wants to protect. The latter occurs because of the (unintended) hierarchical legal effect in the court of law that are caused by European directives. ‘Lesser’ legal regimes in the legal pluriform hierarchy become less useful to oppose economic interests that ‘eat away’ and fragmentise the available ecological space. The Dutch regional authorities are also not sure that all environmental indicators are calculated in the same way all over Europe. This is another threat to credibility and legitimacy. The level of variety as preferred by the policymakers requires explanation, flexibility, and administrative room for local interpretation (discretionary power). Even within the same country, it takes time and effort to understand the different ways to calculate sound level measurements, visualisations, and mappings. Water quality differs with temperature. Ecological complexity defies simple arithmetic. There is a relationship between legislation and methods of calculation; changes in calculation methods on the European level may cause changes in Dutch and regional legislation. This problem increases when supporting technologies are designed in inappropriate ways.

Figure 14: The Kuifeend, together with the geese, is probably one of the best legally protected species of birds and a symbol of the legal struggle in the Markermeer/IJmeer area in 2008.

Having described the challenges in more general terms, I will now proceed to the discussion of the existing practice at the Province of Flevoland that concern the Living Lab use case. The province of Flevoland is legally responsible for the proper process of spatial planning in the area. This implies the organisation of the cycle of ideas, orientation, deliberation, summary, decision making and democratic voting, as well as enforcement and adjustment. It is seen as a difficult task to reach agreements that sufficiently satisfy the needs of all actors and interests involved. Constraint analyses and constraint satisfaction are very difficult. Current practice in the creation of the next regional spatial plan (Omgevingsplan) is to set a number of consultation rounds. The different perspectives are taken into account. These iterations are meant to identify the most feasible solution for the allocation of different elements in the spatial planning, such as infrastructure, ecological compensation measures, housing areas, recreational areas, business areas, mining areas, and so on.

The next stage is more formal. Based on many consultations, a limited number of scenarios is chosen and offered for zienswijzen. These zienswijzen are written comments and objections about the proposed scenarios that are formally submitted by stakeholders during the proceedings. They have to be taken into account during the next stage, which are the official hearings of the regional council. After the decision of the regional council, the national parliament has to confirm the regional spatial (structural) plan.

The consultation workshops use paper maps, plastic, glue and pen (hence the name tekensessies, or ‘drawing sessions’). The zienswijzen are depicted on posters and in folder materials. In the illustrations below (see figure 16), you can find the coloured pen ideas as expressed during the workshops. The next pictures are already more formalised and printed ideas. An interesting legal term for our research is the notion of zoekgebied, or ‘seeking area’.
Figure 16: Drawing sessions where people work in groups to co-create new plans with paper, tape, glue and pen on paper maps.

The seeking area is scientifically interesting because it defines a certain – usually larger – geographical area as ‘potentially designated for this or that purpose’. In the regional policies, it also indicates an area where other purposes are less likely to get permits. In the legal sense, it resembles ‘pseudo directives, that although not having a final status yet, will guide future rule making. For our research, the concept of seeking area is interesting because it illustrates the need for flexible balancing solutions during the co-regulation process that may require technological support. I will come back to searching areas and constraint satisfaction in Chapter [VIII].

7.4.1. Managing open public discourse: the problems as seen by moderators in light of legitimacy

Once the maximum consensus is reached, the legislator in its role as moderator prints a number of maps that depict the new status. This status is supposed to stay fixed for a period of four years with the possibility of one extension of two years (art 4.12, environmental law, 2008).
Afterwards the process starts all over again. During my interviews with responsible members of the Living Lab team, a number of issues were identified that could be improved in their eyes.

Figure 18: Printed materials with scenarios as part of the paper based policy making protocol.

The moderator problems as expressed in the Living Lab sessions at that stage are as follows:

1. **Print seems fixed**: The suggestion of fixed boundaries during negotiations that are displayed on printed paper gives little space for negotiations where more space is required to ensure proper exploration and constraint satisfaction.

2. **Slow iteration**: It takes too long to see each other’s opinions where fast deliberations and design iteration are required for co-regulation.

3. **Short trust cycle**: Consensus is based on trust, but chances are that some actors will start behaving counterproductively to that trust during the very long process of consensus building.

4. **Relevance of searching area**: ‘Searching area’ (legal term for opportunity finding) looks fixed, while exploration and negotiation space is required for building support.

5. **Complexity**: It is difficult to convey details and nuances of alternatives.

6. **Planning and assessment**: It is difficult to convey the impact of norms where explanation is required for building support.

7. **Lack of flexibility**: The situation is fixed by law, but in 6 years circumstances can change which could undermine support.

8. **Pluriformity**: There are many layers of law (European, national, regional and local). Another government layer, such as, for example, the Ministry of spatial affairs, may overrule negotiated policy agreement. There are also many aspects to be taken into consideration, such as sound, traffic, economic, historical and ecological.

These problems can be redefined as challenges for the technological support technology.
7.4.2. Use case policy-making moderation tasks and requirements

In the previous sections I have described the concepts on co-regulation, trust, and technologies. Also I have defined a set of attributes of the use case and I have given a description of the actual use case that is representative for the co-regulation practice. Furthermore I have described the methodological issues concerning a Living Lab research approach.

Typically the stakeholders in the co-regulation practice have to balance with highly conflicting interests, and the existing support tools for this have serious limitations as illustrated above. The legislative authorities that act as moderator in the policy-making process were quite aware that the current ways of working required serious improvements. Below, we stipulate the functionalities that a technical solution should provide in order to satisfy these needs. These are combined with the list of earlier remarks that were found during the design of Experiments [I] and [II].

Given the issues we need to solve, we need to establish whether technology in the form of a legal service portal similar to the technology developed for Experiments [I] and [II] could provide the users and authorities with the support that meets these requirements. At the start of the developments in the living lab we made a list of aims that should be realized with the help of the support system to be developed. These aims were:

1. Governmental moderators show enough trust in the solution, given its properties, so that they are willing to use the technology in a high conflict case.
2. Participants are willing to use the technology in the case of conflicting interests.
3. The mapping between the real-world decision and the model is satisfactory and transparent.
4. Participants think their interest and the complexity of the choices are better represented in the new technology, so it enhances legitimacy.
5. Participants believe that the solution offers a better balancing of interest.
6. Participants have a better insight into the legal constraints for constraint satisfaction and exploration.
7. The system facilitates exploration by using the concept searching area.
8. The technology enables to convey legal pluriformity.
9. The technology supports the combination of ‘higher’ and ‘lower’ legal regimes (for example, European directives and national EHS).
10. The technology can provide an overview of the relevant discourse.
11. The technology offers a transparent decision process.
12. The technology is flexible enough to represent reality and negotiation space which print does not.
13. The solution reduces chances to sit in court and so avoid unnecessary costs and decrease of support for the policy to be decided upon.
14. The technology is interoperable with native systems used by the regional authority for reasons of efficiency.
15. The technology is integrated with existing “native” systems used by legislator for reasons of consistency.
16. The technology is integrated with other sectoral information systems and allows for pluriform content such as content related to sound, traffic, recreation, building, ecology.

This list leading to functional requirements has consequences for the technical design of the legal service infrastructure. The technical design has to be tested against these functional requirements. The testing has to start with investigating the technology designs and establishing whether we can meet the requirements by building an application (i.e. is it feasible to build such a digital system?). The Living Lab test will then proceed within the realistic environment of the Flevoland policy-making process (i.e. is it feasible to apply the ideas in the environment where trust can be an issue? In Chapter [VIII], I will investigate the technical feasibility.

7.5. [3] Legal content modeling and management

Planning a yachting marina, extraction of sand for commercial purposes in a protected area, construction of new houses, planning of roads and tunnels – all these issues have to be seen in the context of legal constraints and policy intentions. These legal constraints are expressed in concepts and norms (prohibitions, permissions, obligations) which obviously should relate to sources of law. Winkels calls these steps the abstraction from case description into the ‘legal world knowledge’ (Winkels 2002, p. 134). The second challenge is that the rules and norms state what is protected or which environmental goal should be respected in very broad terms. The regional authority has the task to provide interpretations of those intentions and protected objects and seek a fit between all human economic, recreational, and social activities, on the one hand, and those boundaries, on the other hand. In the case of a new area, such as IJmeer Markermeer, things are not yet clear. There is ‘open space’ to fill. Every four years, the regional authority generates regional plans consisting of over 210 pages of text with very verbose expressions suggesting consensus. By law, this period can be extended to 6 years (situation in 2008). These regional plans are legally binding but unfortunately the implications of the broad expressions of consensus contained in them do not provide clear answers to business managers seeking opportunities like the ones described in Experiment [I]. Coming to clear directions for these practical issues would require a non-trivial interpretation (inference) task of the civil servants involved. The political texts in these regional plans are left vague on purpose (soft legislation), and the civil servant has the tricky job to make it more concrete without unauthorised ‘stepping in the shoes’ of politicians.

Given the use case and the moderation issues, the next challenge for the supporting technology design process is to translate the ‘legal constraints’ for the intended activity of
a business manager or project developer (land use attributes) into operational and realistic business rules for case assessment. This is a step from general requirements towards specific requirements for this co-regulation use case.

The majority of the committee, all but member Donner, are in favour of the notion of a subjective right on government information. The same majority supports a dedicated duty to care for the accessibility of that information. In this context the Committee proposes a new article in the Constitution:

1. All citizens have access to government information;
2. Government takes care of the knowability of that information;

(Committee constitutional right in the digital age, 2000, in ROB, 2003)

The final part of the challenge is to translate the general rules, policies, intentions and norms into a decision model that allows for reasoning with the constraints relevant for specific activities or land use scenarios. The figure below illustrates the process of inference from case and policies towards legal world knowledge and case outcome (see figure 19). The case inference process should be supported by the articulation side: the business manager has to be able to articulate his case. The case outcome should be visualised in the portal, but in a way that allows for alignment of plans.

The interviews and discussions within the Living Lab team and during the preparation of Experiments [I] and [II] have led to a broader notion of legal information provision as described in Chapters [IV] and [VII]. A part of this contextual information is legal sources and another part is about expert opinions, research reports, cost calculations, planning variants, and so on. Public authorities are responsible for a subset of this information. From our legal service perspective, these government agencies are responsible for a mapping between business legal information needs, societal information needs, and legal constraints. Following Boer, et al. the management of the range of information that is related to the legislation will further be referred to as ‘legal content management’ (Boer et al, 2007).
7.6. Legal content management tasks for technology design

From the Living Lab sessions, we have identified a number of tasks. According to the involved users – specifically, the policy specialists at the regional authorities of Flevoland and South Holland – the tasks for legal content management that should be supported were as follows:

1. To identify a number of most likely business activities and land use.
2. To identify the human activities or land use attributes and map them into the categories of effects on the geographical environment.
3. To identify the effects against the protected areas and policy intentions.
4. To map the effects and the affected areas into one model of activity and land use versus legal constraint in a conflict Matrix.
5. To identify the hierarchy of policy priorities and legal hierarchies (different rules affecting the same geographical area)
6. To identify the relevant non-legal content (informative documents) for those activities
7. To identify the relevant environmental analyses documents (e.g. which bird species need what ecological attributes).
In addition to this user-required task support, I have added a special set of legal content management tasks for digital support:

8. To model the constraints in such a way so that they become business rules ‘behind’ the digital map you move your cursor around.
9. To create the affordance of a “cursor-controlled mechanism for digitally browsing a searching area” with the cursor.
10. To technically enable negotiation support capability.
11. Integration into a service portal.

The task design for the technology was performed by following a number of steps in the Living Lab design sessions, corresponding to the tasks listed above namely:

Step 1: Identify and categorise scenarios in classification of land-use within the use case context and identify specific interests that have to be balanced.

With the help from the regional authority experts in several Living Lab sessions, the business activities (land uses with attributes) of the stakeholders in this experiment were grouped, including recreational business (yachting), building construction, NGO protests like protection of birds or green islands, as well as transport types like shipping and fishing routes. These had to be defined in the terms that corresponded with the policies, the legal processes, and the actual geographic locations in the area that were governed by the province.

The grouping followed common sense reasoning patterns, addressing typical balancing issues addressed in spatial planning, including:
- ‘Recreational’ versus ‘ecological’
- ‘Building and ‘infrastructure’ versus ‘recreational’
- ‘Fishing’ versus ‘infrastructure’

These reasoning patterns followed the same balancing act between interests as was carried out during the paper-based sessions that predated our experiment with technologies.

On the next page you can find an extract of the Handreiking, or ‘instruction guide-line’, made by a Living lab team member who condensed the 210-page political consensus documents (e.g. omgevingsplan, or regional spatial plan) into a guideline with terms (semantics) and their legal sources. Its title translates as: ‘Interpretational instruction guideline for interpretation of legislation’ (Peters, Hoekstra 2008). It supports the notion that it is in fact feasible to translate broad policies and intentions from their legal source into generic rules and legal knowledge concepts that fit the requirements of an automated system. For this translation, a number of steps were taken based on the Living Lab design discussions.

Step 2: Translate broad policy intentions into a table of intentions, authority in charge, decision protocol, and legal source documents.
The instruction guideline consists of a taxonomy of land use terms (e.g. living and building houses in agricultural areas), an additional sub class (e.g. suburban area building), the jurisdictions involved (e.g. municipality jurisdiction and regional interests and jurisdiction) the procedures involved, the legal source involved (e.g. European directives), and available maps. Although this instruction guideline was originally written for fellow civil servants at municipality-level, it contained the inference logic and normative qualifications that users should apply. This was first specifically relevant for the civil servants that had a role in spatial planning, in order to comply within the intended policies represented in regulations by the legislators (in line with Winkels, 2002). The way these instructions were formulated proved to be a good basis for our technical design of the case assessment tool that was to support business in finding relevant legislations related to the cases at hand. The pages of the Handreiking below are those concerning the ecological main structure (nature EHS) and those concerning design of urban areas.

Table 2: Extract (below) from the 37-page instruction guideline (Handreiking) by Jolanka van der Perk. This list of terms was essential for creating the semantic reasoning support tool.
De provincie wil natuur beschermen en ontwikkelen, maar ook ruimte bieden om andere maatschappelijke ontwikkelingen zoals woningbouw en recreatie vorm te geven. Hiervoor worden de mogelijkheden van natuur inclusief ontwerpen en een saldobenadering verkend.

Voor de EHS geldt in beginsel een 'nee, tenzij'-regime, maar wanneer door toepassing van de saldobenadering de maatschappelijke en ecologische ontwikkelingen zo'n extent worden aangewend dat zij elkaar niet belemmeren maar versterken, en daarmee bijdragen aan het totale netwerk van de EHS, kan dit regime worden omgebogen in een 'ja, want'.

Een blijvende gunstige of betere staat van instandhouding voor soorten en habitats moet dan zijn geënterd.

Verwijzing van functies waarbij de saldobenadering wordt toegepast, is alleen mogelijk op gebiedsniveau en op basis van integrale gebiedsplannen.

Eventueel is een gedeeltelijke (her)begrenzing mogelijk. Daarbij moet de omvang van de EHS minimaal gelijk blijven en er moet een kwalitatieve verbetering van natuurwaarden optreden. Toepassing van de voorgestelde 'neening' wordt gezocht naar locaties grenzend aan of binnen de bestaande EHS.

Initiatieven die mogelijkwerk zorgen voor een gunstige of betere staat van instandhouding voor soorten en habitats moet dan zijn geënterd. Bij de saldobenadering wordt inderdaad de voor de natuur gunstige (abiotische) omstandigheden, waardoor natuur inclusief ontwerpen en schildering bijdragen aan verbetering en verduurzaming van het netwerk van natuurgebieden.

De saldobenadering kan niet worden toegepast in prioritaire gebieden. Initiatieven die mogelijkwerk zorgen voor een gunstige of betere staat van instandhouding voor soorten en habitats moet dan zijn geënterd. Bij de saldobenadering wordt inderdaad de voor de natuur gunstige (abiotische) omstandigheden, waardoor natuur inclusief ontwerpen en schildering bijdragen aan verbetering en verduurzaming van het netwerk van natuurgebieden.

![Waardevolle gebieden](image)

**Europees beleid:**
- Vogelrichtlijn
- Habitatrichtlijn

**Landelijk beleid:**
- Natuurbeschermingswet
- Aanwijzingsbesluiten Natura 2000 gebieden door rijks: Rons- en Faunawet
- Boswet
- Spelregels EHS

**Provinciaal beleid:**
- OPF 2006:
  - natuur (par. 5.4)
  - fig. 16, EHS en indeling naar waarden

**Natuurgebiedsplannen**

De saldobenadering wordt inhoudelijk uitgewerkt in een uitwerking van het Omgevingsplan Flevoland 2006.

In gebiedsomschrijvingen zijn de wezenlijke kenmerken en waarden vastgesteld.

Initiatieven die mogelijkwerk de EHS en Natura 2000 gebieden kunnen beïnvloeden: altijd vroegtijdig informeren om zodanig mee te denken in de planontwikkeling.

**Europees beleid:**
- Vogelrichtlijn
- Habitatrichtlijn

**Landelijk beleid:**
- Natuurbeschermingswet
- Aanwijzingsbesluiten Natura 2000 gebieden door rijks: Rons- en Faunawet
- Boswet
- Spelregels EHS

**Provinciaal beleid:**
- OPF 2006:
  - natuur (par. 5.4)
  - fig. 16, EHS en indeling naar waarden

**Natuurgebiedsplannen**

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De saldobenadering wordt inhoudelijk uitgewerkt in een uitwerking van het Omgevingsplan Flevoland 2006.

In gebiedsomschrijvingen zijn de wezenlijke kenmerken en waarden vastgesteld.
Vestigingsbeleid (GVV). De afstemming over de GVV's met de provincie vindt via het economische spoor plaats.
Als de provincie een GVV heeft goedgekeurd kan bij de gemeente bij de bestemmingsplannen naar het GVV verwijzen voor de onderbouwing. De bemoeienis van de provincie met de insituering van de woningen kan dan afnemen.

Vestiging van detailhandel dient uitsluitend te worden gecommuniceerd in of aansluitend aan bestaande bebouwde gebieden.

De detailhandelstructuur is complementair opgebouwd naar functionele en aan locatiegebonden winkelcentra. De fundamentele werklocatie is afhankelijk van de positie van de kern in de (provinciale) stedelijke hoofdstрукturn en de locatie binnen de kern. Er dient zoveel mogelijk te worden aangesloten op bestaande detailhandelconcentraties. Als dat niet mogelijk is, zal op plekken in of aansluitend aan bestaande bebouwde gebieden ruimte worden geboden. De detailhandelstructuur mag niet duurzaam worden aangetast.

De ontwikkeling van detailhandel binnen stedelijk gebied is in principe aan de gemeenten. Binnen de detailhandel zijn sterke veranderingen in vraag en aanbod gaande. Daarbij gaat het om branderververaging, grootschalige ontwikkelingen zoals megasupermarkten, grootschalige thematische ontwikkelingen (sport en vrije tijd), aan de rond van steden te vestigen winkelcentra en detailhandel vanuit groothandelbedrijven. De provincie wil daaraan ruimte bieden en bepalen waar de bovenlokale belangen liggen. In het Omgevingsplan is een uitwerking van een ruimtelijke visie op de detailhandel aangekondigd.

Bij grootschalige ontwikkelingen detailhandel:
Vroegtijdig informeren om zo nodig mee te denken bij de planontwikkeling.

Provinciaal beleid: OFF 2006:
- bedrijventerreinen (4.1.2)

Gemeentelijk beleid:
GVV

Bij kleinschalige ontwikkelingen detailhandel:
Voegtijdig informeren om zo nodig mee te denken bij de planontwikkeling.

Provinciaal beleid: OFF 2006:
- bedrijventerreinen (4.1.2)
- landbouw (par. 5.2)

Beleidsregel kleinschalige ontwikkelingen in het landelijk gebied:
Landbouwvisie 2003

In het landelijk gebied is detailhandel veel beperkt toegestaan voor de verkoop van eigen gekweekte of vervaardigde producten en/of verkopen van producten met een directe binding aan bepaalde toeristisch-recreatieve voorzieningen.

Binnen de detailhandel zijn sterke veranderingen in vraag en aanbod gaande. De provincie wil daaraan ruimte bieden en bepalen waar de bovenlokale belangen liggen. In het Omgevingsplan is een uitwerking van een ruimtelijke visie op de detailhandel aangegeven.

(zie ook kleinschalige ontwikkelingen in het landelijk gebied)

De provincie acht de ontwikkeling van het bedrijventerrein bij Larserpoort/Luchthaven van regionaal belang.

(Voor de ontwikkeling van de luchthaven zie ook onder infrastructuur)

Bedrijventerrein bij Larserpoort/Luchthaven

De provincie acht de ontwikkeling van het bedrijventerrein bij Larserpoort/Luchthaven van regionaal belang.

(Voor de ontwikkeling van de luchthaven zie ook onder infrastructuur)

Landelijk beleid:
- Luchthaarweet
- Wetmilieubeheer
- VNG brochure bedrijven en milieuzonen

Provinciaal beleid: OFF 2006:
- fig. 11: stedelijk gebied

Beleidsregel locatiebeleid stedelijk gebied
Gemeentelijk beleid: GVV
The example in *table 3* shows the detailed regulations regarding Natura 2000 area’s. These area’s are governed by a ‘compensation policy’. This policy prescribes, that any action plan that contains elements that would damage the ecology, would also have to bring actions that support that ecology to the same extend as the damage that was caused. The example illustrates the need for negotiation space and alternative opportunity finding.
Step 3: Create a list of end user search terms

The end users of the system which we were to create spoke a different language than legal professionals. Therefore, we had to build a bridge between the legal terms and the terms used by our potential end users. A starting point for this undertaking was a list of terms as would be used by the non-legal users. A second list consisted of those used on the Flevoland website by visitors. This list of ca. 300 terms is visible in the yellow highlighting in the Dutch version of the Handreiking. The list depicted below was obtained by copying the terms that were used by visitors of the Flevoland website, thereby indicating their perspective and their needs for visiting the Spatial Planning website. This is a version of a ‘folksonomy approach’ (I. Peters, 2009) that aims to bridge the gap between ‘expert knowledge’ about the domain categorisation in a legal context and the searching behaviour of the actors.

Figure 20: Keywords used by visitors of the Flevoland regional authority analyzed, clustered, and applied as keyword entry for opportunity finding in the legal service portal.
Step 4: Create a matrix with interests and policies

Normally, during the many sessions and workshops about the new spatial development plan, the civil servants involved use an approximation approach in which they come to a final spatial plan. Consequently, this final plan is the best achievable compromise of conflicting interests. In the intermediate stages, proximity or nearness plays an important role, as these intermediate results are the basis for negotiations with the stakeholders. Examples of topics where approximation is used include:

- Sound zoning around ecological areas
- Estuarial size dimensions
- Open view sailing area dimensions
- Fishing area dimensions
- Shipping lane width and depth

Some of these intermediates states are ‘maybe conflicting’ classifications. I will come back to this notion in step 5. After lengthy discussions in the Living Lab with the civil servants of the regional authority, a reduction of many different land use business activity scenarios became possible. We have decided to use 6 main categories, namely ‘green’, ‘heritage’, ‘.transport’, ‘industry’, ‘recreation’ and ‘build’. Figure 21 & 22 show the potential conflict matrix where the conflict attributed indicates where a conflict between two main categories would exist. In order to fill this conflict matrix, policy and legal experts had to analyse the legal sources and policy documents for potential conflicts between different land-use activities. We used a matrix to describe the mapping between legal sources and the allowed land use activities (see figure 22). Thus we could step-by-step describe the potential conflicts that result from several hundreds of pages of legal and policy documents. Obviously in actual cases we should be able to explain the exact conflicts by referring to and presenting the legal and policy content in detail.
Figure 22: Legal sources to allowed land-use activities mapping matrix.

<table>
<thead>
<tr>
<th>Problem-own authority</th>
<th>Land use</th>
<th>Attribute</th>
<th>Legal source conflict-type</th>
<th>Authority</th>
<th>Land use</th>
<th>Attribute</th>
<th>Legal source example</th>
<th>Gezone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Build 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forested or wooded</td>
<td>distance to housing direct</td>
<td>yes</td>
<td>housing</td>
<td>urban, build</td>
<td>large scale</td>
<td>national housing directive</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>distance to nature2000 km</td>
<td>near coast</td>
<td>yes</td>
<td>habitat</td>
<td>Nature2000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>not on water</td>
<td>no</td>
<td>ecology</td>
<td>EHE</td>
<td>Nature 2000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Build 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infra</td>
<td>distance to nature2000 km</td>
<td>no</td>
<td>ecology</td>
<td>EHE-silence</td>
<td>clear water, nature2000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>in water</td>
<td>yes</td>
<td>water</td>
<td>water directive</td>
<td>map layer water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational</td>
<td>distance to nature2000 km</td>
<td>no</td>
<td>recreation</td>
<td>open space</td>
<td>no connection current or lock to open water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>in water</td>
<td>yes</td>
<td>water</td>
<td>water map</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational</td>
<td>distance to nature2000 km</td>
<td>no</td>
<td>recreation</td>
<td>open space</td>
<td>no connection current or lock to open water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>in water</td>
<td>yes</td>
<td>water</td>
<td>water map</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Step 5:** Identification of intermediate stages.

This ‘mapping-of-activity-against-constraints’ approach in principle creates a straightforward inference matrix of ‘building’, ‘recreational’ and ‘green’ activities derived from the guidelines and terms list provided by the specialist (see figure 22) which can be set against IMRO codes of land use, legal sources with constraints (allowed, disallowed or silent).

**Step 6:** Defining obvious negations of possibilities.

Business activities would also have to be mapped against the impossibilities: sailing is negated on land. These opposites would change color on the map as a result of the business rule engine.
Step 7: Integrate the legal content management matrix with software powering the service portal.

This mapping between the legal policy design task and the technical design task is probably the most challenging part of the Living Lab co-creation process. The mapping requires a common understanding of user needs, moderator needs, technical possibilities, software building, interface building, and, above all, a common understanding of categorizations or classifications. There is a great risk of misinterpretation and underestimation of the complexities involved. There is also a barrier of several cultures (legal and textual, graphical design, classification expertise and software coding) — hence, the need for numerous iterations, discussions, and the building of many demos and prototypes that would provide a ground for common understanding.

Figure 23: Inference of case into models and translating models into classifications.

Figure 24: Translating classifications into digital mapping technology for the service portal.
Step 8: Create user interface and moderator interface in a service portal

The user interface is map-based. Many pages in this dissertation dwell on the significance of usability. The affordance of functionality was a core contribution that technology could make over paper. Therefore, the co-creation of the user interface was a project in itself. The legal service portal with map-to-legal-source functionality has been shown in Experiment [I] (Adwijzer, see Figure 25).

Figure 25: Map-to-legal source functionality (see Chapter IV).

This portal fitted the demands of a range of tasks, like content management, map-based case analyses, and retrieval of location-based legal source documents. It failed however in a number of other aspects like maintainability and the search for opportunity as (see Chapter [IV]. The opportunity finding affordance was created with visualised overlaps of coloured areas. This was enabled by the ability to switch ‘On’ or switch ‘Off’ the relevant ‘map layers’ that negated options by depicting coloured area’s (ticking a radio box activated for protected areas under some legal regime, for example). Given these visualisations, the user could analyse the conflicts and opportunities. This would not provide answers like ‘please provide me with the location that fits with my business activity’, however. For that purpose, I will have to integrate the legal atlas affordance of Experiment [II] with the portal functionality and content management functionality in Experiment [I].

In the case of the real world of Flevoland, I had to design a mechanism for retrieval and maintenance for the relevant legal source content and include the moderator and content management tasks as described earlier. The content, such as regional regulations, national policies, economic context, European directives, expert reports, NGO counter expertise reports, etc., should be made available for a certain specific geographic area or object on the map.

For the support of negotiations during co-regulation, the design had to be improved to include possibilities for actors to digitally explore the negotiating space as used in the tekensessies (in English: drawing sessions). The digital systems that were available at the time of the living lab had a number of problems, namely:
These systems were not aligned with operational systems
¬ They were not maintainable
¬ They didn’t support negotiation
¬ They didn’t support keyword-to-opportunity exploration
¬ They didn’t have a map layer showing legal effects of intended policies nor did they reflect the reality of balancing legal regimes

Step 9: A digital searching area: Technologies supporting the balancing of interests

These searching scenarios would be represented by a user moving a cursor with attributes connected to that searching scenario over a digital map in a “searching area”. The technology supporting this task was inspired by a popular game, Simcity, and is explained in the next Chapter about technology. The stakeholder could choose from a selection of business activities or environmental protective measures and discover what the legal service portal (cursor with now predefined attributes) would generate as problematic areas (disallowed) or as opportunities. The problematic areas would be defined as their “opposites”. Thus, if you would, for example, start with an environmental protective measures scenario ‘second coastal lines’ for the ‘renewal of green habitats’, it will show the negative consequences on a competing scenario focusing on recreation.

The matrix resulted from an analysis of typical activity scenarios that are subjected to spatial regulations. Activities and land use related to the scenario “transport” turned out to be quite similar in their effect to the scenario ‘building’. ‘Green’ activities required both ecology renewal and habitat protection as separate search scenarios. Activities concerning the ‘recreation’ required both slow sailing and fast motorboat as search scenarios. These search scenarios would be represented by a user moving a cursor with attributes connected to that searching scenario over a digital map in a ‘search area’. The matrix in our example contains six main activity scenarios (two building, two recreation, and two green (see fig.). It then recites the policies involved, the implications for the logical relationship with constraints (e.g., > 200 m distance to the shore), the legal source and the relevant IMRO land use code. Based on the policies as stated in ‘the Handrijking’ and derived from the legal source like those of the Provincial Council, the conflict state is defined as ‘conflicting’, ‘maybe conflicting’, and ‘not conflicting’. The ‘maybe conflicting’ category is interesting. It signifies the negotiation and consideration space that can be visualized in a digital support system.

Step 10: Analysing negotiation support

It was already demonstrated that, in the reality of Flevoland use case, the top-level legal regime (European directives) turned out to be an overall show-stopper. The European directive concerning Natura 2000 regulations (see earlier Chapter [VII]) would indicate that all options were negated everywhere (see figure 26). Any scenario would receive a ‘disallowed’. It was stated that the early digitalisation that was used in practice then at
the Flevoland back office would not support any negotiation. Both the protected geese and the Natura2000 examples imply a regime that is overly restrictive.

**Figure 26:** Natura2000 directive blocking all activities as indicated by yellow striping.

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7.6.1. Translating traditional visualization and negotiation processes in new digitalized versions

In the paper version of visualizing seeking areas (see figure 27), it is difficult to offer actors the affordance of negotiation space. It is static and seems fixed. In order to improve this situation we organized some drawing session leading to some interaction and
representation models. Figures 28, 29 and 30 are examples of some of the design sketches that were used as a basis for the design of our co-regulation support environment.

Figure 27: Business activity seeking balance with ecological policies (building recreational island) as attribute to a moving cursor moved towards seeking an area for ecological estuary.

Figure 29: Approximation of recreational island near ecological estuary: seeking area indicates conflict but not yet unacceptable adjacency.

Figure 30: Approximation of recreational island moved in unacceptable geographical adjacencies to estuary: seeking area turns red.
During the living lab sessions, it was concluded that this design with affordance for consideration by the actors resembles most the actual behaviour of stakeholders in different stages of negotiations on paper versions. There were arguments to use the computational power to pre-calculate all policy-balancing options and provide the actors visually with all possible locations with the least mutual damage. There were several arguments against this theoretical pre-calculated design solution, namely:

- This pre-calculated design assumes that all factors of the complexity involved can be known and mapped beforehand, whilst in reality many variables are a matter of expert opinion, leading to as many expert opinion reports.
- New ideas and new perspectives develop over time and in interaction.
- This pre-calculated design solution assumes temporal synchronicity, whereas in reality many interests and lobbies vary over time and, therefore, boundaries shift over time.
- Actors like to discuss and discover each other’s reasons for objections and a discussion helps to create trust and consensus, where actors are willing to actively take the other’s plans into consideration. Pre-calculated solutions would skip that process.
- Showing all possibilities together would crowd the graphic user interface and moving around browsing the area is what people like to do.

**Step 11: Integration into a portal**

Integrate legal source content, policy documents, research reports, expert opinions, and so on with service portal layers of logic, database, and term libraries.

I will elaborate on the technical integration part and its feasibility in Chapter [VIII]

### 7.6.2. Critical reflection: About legal servicing and deliberation

This approach of constraint analyses could be seen as what Bench-Capon and Prakken call ‘a two phase democratic deliberation’, where they use ‘preferred semantics’ and ‘proposed selection criteria’ in a more formalized setting: “in the criteria deliberation phase, the participants propose and attack criteria for proposals. In this section we give a set of argument schemes (defeasible inference rules in the ASPIC framework) that can be used for these purposes. The distinction between sufficient and necessary criteria (relative to something desirable) is important, as these will be used differently in de second phase. The outcome of this phase is one or more sets of admissible criteria; these sets will be used in the second phase to make and assess proposals” (Bench-Capon and Prakken, 2010, p. x). The notion of a two-stage deliberation model concurs with the requirements of a technical design approach. The inference matrix is used during the design phase of the system we are designing for Experiment [III]. Bench-Capon and Prakken call this the ‘criteria deliberation stage’. During the ‘proposal deliberation stage’, the users will balance their interests supported by technology that uses the matrix. A number of researchers have investigated ‘legal information service provision’, as described earlier in Chapter [III]. In one of the relevant articles, Breuker specifically mentions spatial
reasoning as a support mechanism for what he calls “inference making”: The upshot of this short and informal analyses of what is in a legal question is that answering almost always requires making inferences. They are of two types: about the world of regulations refer to and about the relationships between articles or cases in a legal source, in particular the structure of exceptions. This full answering of legal questions is called ‘legal information serving’, in contrast with database retrieval aimed at collecting legal sources which contain similar or the same terms as the request (Breuker, 2002, p. 92). The search can only halt by a match or a contradiction and both are often not derivable from the regulation itself, but by common sense reasoning, e.g. the required spatial reasoning on the pair of bicycles in the example’ Breuker elaborates on the requirements for legal information serving and provides a number of aspects of making inferences to provide a service, like situation descriptions, taxonomies, world models, and decompositions. Breuker states that Spatial reasoning is often left to common sense (A is close to B and K is very far from L) whereas in our designs, spatial reasoning is a core mechanism for deliberation.

The matrix depicted in figure 21 & 22 resulted from many discussions in our Living Lab about business activities, land usage, and legal constraints. The result is a simplified mapping of the real (legal) world in the Flevoland case, but it provides enough complexity to build a reasoning engine for a legal service portal demonstrator to test in Experiment [III]. It assumes business representatives, NGOs, and recreational agencies. Those actors can choose among a limited amount of scenarios that represents their interests. The claim is that this type of legal argumentation is capable of handling more complexity than the paper versions of legal argumentation, since the geographical concept of locality is added. A moving attributed cursor generates the affordance of ‘geographical constraint satisfaction’ or the visualization of negotiation space, whereas text-based decision trees can only provide arguments as such. In the legal service portal as designed, the allocation of, for example, a wind energy park would not only depend on logical argumentation of ‘wind mills’ versus ‘recreation’; it would also allow for geographical approximation as a dimension of argumentation. The closer the windmill is located near the area intended for recreation, the more problematic the land use ‘recreation’ may become, but these are not absolutes with clear boundaries, but variables subject to considerations and negotiations in the balancing act. Those variables can now be visualized using digital technologies in the ways that that paper could not.

As stated earlier in the chapter, validation of the pre-test phase of this research is rather organic. Evidence of the process is in countless mails with hundreds of documents, designs, suggestions, and mock-ups. The downside of this productive co-creation process is its unstructured format and loose organisation. This research approach is almost impossible to reproduce in exactly the same way. By describing the design steps in detail, the researcher can produce transparency about the research findings. It is also crucial to remain independent – that is, not involved as a consultant or as an interested party – which becomes increasingly difficult when one becomes excited by the problem space and the potential of solutions. The involvement of the action researcher should be in providing the ideal policy making platform and not in saving geese or allocating windmills.
Some of the issues with this use case could be solved by filling a simulation-based participative GIS. This was actually proposed and demonstrated by a number of consultants and suppliers to Flevoland authorities. Unfortunately the participative GIS solutions proposed were not aimed at creating a maintainable and extensible solution. The Living Lab team had several doubts about such a solution, specifically:

- From their experience, the simulation based system that were offered by the suppliers would not capture the complexity of the case (ambiguity, constraint analyses, pluri-formity).
- The investment for the simulation offered by the suppliers would be for a single process and a new problem would require again an entire new investment.
- The systems that were suggested had no relation with the available data in the operational daily systems, so all content and data had to be brought in each time.
- Every simulation would have a steep learning curve for moderators without knowing the outcome.
- Every simulation would have unacceptable steep learning required by users;
- The suggested systems were not integrated with other relevant public sector systems, and consequently lacked integration of different policy domains at stake, like culture, economy, or heritage.
- The suggested systems had no integration with legal frameworks, and were therefore not maintainable.

These disappointing experiences with earlier participative GIS simulations has led to the living lab approach described here. The input from the discussions, the requirement analysis and design sessions, etc. were used to iteratively create a support system for co-regulation. The development of this system is described in the next chapter.
Citizens are increasingly demanding greater transparency and accountability from their governments and want greater public participation in policies that affect their lives. Educated, well-informed citizens expect their governments to take their views and knowledge into account when making decisions on their behalf. Engaging citizens in policy-making allows governments to respond to these expectations and, at the same time, design better policies and improve their implementation.

Paul Frissen

Technical feasibility: building a co-regulation portal
In Chapter [VII], I proposed a validation process as a part of the living lab research approach based on the triangulation of the pre-test, focus-group test, and the post-test triangulation. This chapter discusses the feasibility of the design. Validation of the claim of enhanced legitimacy by co-regulation using technologies requires pragmatic feasibility tests. First, the technical components will be described that create the functionalities and the service infrastructure described in previous chapters. The ideas for solutions that were discussed in the living lab were partly based on Legal Atlas and the Dutch information model for spatial planning (IMRO). A second part was developed in collaboration with Public-I, a UK-based company with 20 years of experience in participative technologies. Another part was based on over 10 years of research on the formatting of sources of law, legal knowledge representation languages and legal information systems from which CEN/Metalex and other standards have emerged. Together they form a bridge between legal content and technical infrastructure. Some of the ideas on interface design were based on the concept of one of the first successful computer games ever: SimCity. I will then continue giving an in–depth overview of the application and the infrastructure as based on principles such as interoperability and proper architecture (see Chapter V). To enable case assessment by the users, the text-to-map versus the map-to-text theme has to be defined and implemented in the co-regulation portal. What would such a service portal look like and what type of technology is required to enable moderation as part of co-creation? What type of interface suits the expression of norms in an online portal? This brings us to the ‘attributed cursor’: the consideration and negotiation support that enables co-regulation. Finally, a display of the prototype that was built on the Flevoland legal infrastructure is presented in several case scenario examples.

8.1. Towards a co-regulation portal

Casellas provides an excellent overview of the attempts made thus far to bridge the gap between law and computers. Quoting Tom Gordon as president of the ICAIL in 2007, she states that ‘lawyers working in artificial intelligence and law tend to drift to computer science departments. [...] “Law schools courses on legal philosophy and jurisprudence, legal theory, legal methods or legal writing are typically not informed by AI and Law results.”’ (Casellas, 2011). It is a challenge to design technical support for lawyers. It may even be more of a challenge to design technical support that those lawyers might actually use.

The technical feasibility challenge in this chapter is to design a Legal Information Service Portal that enables case assessment, legal effect planning, and co-regulation for the stakeholders to work with. This is a part of the mixed validation strategy in the living lab research approach.

I have established that map technology has a good chance to enhance transparency and access to law thus supporting legitimacy. For the part related to improved case assessment (knowability) and legal effect planning, I have demonstrated the basic principles in Experiments [I] and [II]. I need to test those generic designs in the concrete situation of
the use case IJmeer Markermeer of Flevoland with the content and the usability designs described in Chapter [VII]. The main new mechanisms enabled by technology have to do with the moderator tasks and the actors seeking to balance their interests against those of other actors in the area. The feasibility test and technical challenge here is to establish whether the designs for these tasks work for the use case of IJmeer/Marker Flevoland.

Another feasibility challenge for the technical design of the infrastructure is the setting in the context of the existing legal drafting processes and the legal practice of regional authorities. The research question is: Is the technical design based on the architecture and standards as described in Chapter [V], and the user challenges as described in Chapter VII applicable in the real world environment of our existing Dutch policy-making and legal decision-making systems? In other words: Is this ideal technical support solution for co-regulation feasible in the context of the real world? The question addressed in this chapter is if we would be able to develop a working environment, i.e. a working technological solution supporting co-creation that would work in the complex daily practice of policy-making and that could be integrated within the existing legal service infrastructure.

The working environment to be designed should help the various actors involved in co-creating regulations in the exploration of the problem space, the consideration of other plans and the balancing their interests. In order to support them in this complex task a support system should contain different components supporting the constitutive tasks of such co-creation process. The design of these components should invite the user to interact with the system in an intuitive way and help them to make optimal use of the support offered to them. This is essentially what affordances are about (Gibson, 1979).

The following functions should be included in the co-regulation portal:

1. **Forum support** (forum support, flexible, fast iterations, fast consensus building, effect demonstration, pluriform sectorial domains as defined in Chapter [VII]).

2. **Content management support and user interface** as described in Chapter [VII]. This function should allow users to upload and retrieve relevant content and legal sources in a map based interface. In addition to general upload and download facilities the interface for retrieving content (knowability) should support the use of keywords or user scenario’s to find relevant opportunities (earlier described as text-to-map in legal planning in Legal Atlas). The content management system should also enable annotation of content.

3. **Knowability**, overview, presentation of the debate history.
   - get an overview of the cases, discussions content and content ownership.
   - provide a logging overview of deliberation history.

4. **Opportunity finding**. This is an important addition to ‘traditional’ PPGIS portals and it integrates the functionality of legal atlas in Experiment [II] (legal effect planning).

5. **Modelling support between policies, norms and the system parameter**, including the visualization of the results of applying inference processes on various types of domain knowledge.
6. **Negotiation support**, this functionality should help users to see where their plans fit or are in conflict with other stakeholders plans. The design should invite the users to:
   a. explore negotiation space.
   b. explore searching areas, balancing interests against other interests.
   c. upload their own views and content for a certain area or plan.
   d. visualization of negotiation space.

The following attributes were part of the research, but not of the test in experiment [III], since system integration with the systems of the authority would only occur after a positive outcome of Experiment [III]. The current assumptions about that particular part of the overall feasibility of the solution was based on assumptions of the part of the living lab team that would be become responsible for this integration in a later phase.

7. **Alignment with the existing operational systems to enable maintenance and cost effectivity:**
   - refined into:
     - ‘native’ connection to the systems of the administrative authority (i.e. the Province of Flevoland) for reasons of efficiency.
     - ‘native’ connection to the systems and protocols of the legislator for reasons of consistency.

8. **Integration of all functionality in the portal of the Province of Flevoland.**

A portal with the functionalities listed above has been realized and tested in a technical sense. The functional user test of this Experiment [III] will be described in chapter [IX]. In this chapter I will show how these functions are visualized creating the desired affordances by presenting screen dumps of the application. The particular choices that were made during the many living lab sessions will be explained in the following sections. We have paid specific attention to the visualization of the functions and affordances as the central theme for this experiment was on usability and maps. The icons, colors protocol indicators, prioritization indicators, and general layout of the screens all resulted from intensive deliberation with the users in our living lab and interface design experts involved in the project. The interface design and visualizations of its components were designed in such way that different users with different aims, cognitive styles and preferences would be able to work with the system effectively. Recent research on online deliberation platforms, conducted by other researchers after our Experiment [III], stresses the significance of supporting different cognitive strategies applied by the participants of this type of discussions and the need for more ways to find the relevant discussion in on line deliberations (Manosovitch et al., 2014). The operationalization of technical feasibility was chosen in a pragmatic way. The design is feasible if we can actually build the system and if the technical experts and the moderators of the Province agree to installation of the solution and are prepared to use the system in the actual deliberation process of IJmeer Markermeer.
8.1.1. Forum support

The on-line forum facility that was specifically designed to support moderation of the deliberation processes was based on past experiences of one of the participants in living lab team. This party, Public-I, had more than ten years of experience in building citizens participation portals. *Figure x* shows two screens that visualize some standard forum moderation functionality that were re-used in this way. The forum support functionalities we have used were a necessary ingredient of our portal, but rather traditional. Therefore I will not further elaborate upon this part. For readers interested in this type of functionalities I refer to Macintosh and Wimmer (2010).

*Figures 1 and 2: Forum Moderator functionality based on the design experience of the UK based eParticipation expert company: Public-i.*
8.1.2. Content management support and end-user interface

The content management functionality that was to support moderators of the co-regulation processes was based on earlier experience in experiment [I] with ADDWIJZER. One of the conclusions of that experiment was the problem with maintenance of legal and other relevant content. This problem was addressed in the design in several ways:

- By creating a legal infrastructure that was connected with the day-to-day policy production- and enforcement systems of the province and cities.
- By allowing participants to maintain content themselves by using upload mechanisms, clustering the attributes that could be attached to business plan with certain characteristics into easy upload scenario's (see fig 3). The user can add terms from the taxonomy, folksonomy and topic list to the content uploader (see fig 3).
- By designing intuitive visual annotating facilities for content. For these annotating facilities we applied a set of icons, e.g. describing the specific steps and stages in the deliberation process that was designed for the purpose (see Figure 2).

Figure 3: Design chosen for the portal based on icons that annotate relevant documents and legal source documents in status, author, and deliberation stage.

The end-user interface is mostly map-based. I this dissertation I have stressed the significance of usability. The co-creation of the user interface was, therefore, a project in itself. Rather than using a quite narrow conceptualization of usability, i.e. a perspective limited to the surface aspects including shapes and colors of display constituents, I focus on the practical usefulness of the entire functionality in the actual context of use, in this
particular case being a complex multi-user, multi-perspective, co-regulation context. To give the reader an impression of the co-created user interface design process I will provide the major design steps. Furthermore I will present some illustrations of the outcome of the interface design process. Many mock-ups have led to the final versions. The design of the portal user interface developed along a number of steps:

- Design of icons and thematic clustering to choose scenarios (what is the business manager or other actor’s user need and how to articulate this need into the system).
- Design of protocol indicators (what is the formal stage in the policy-making process).
- Design of authority indicators for content (whether it is an opinion ventilated by someone of influence\textsuperscript{135}, or an official).
- Design of interfacing method (how one manipulates the mouse containing plans of action).
- Design of legal source content retrieval method.
- Design of conflict indication (cursor turning red).
- Design of negotiating space indication (cursor turning orange).
- Design of possible space for action (cursor turning blue).
- Design of map manipulation icons (panning and zooming).
- Design of content upload and download mechanisms.

Figure 4: End-user interface with simplified business plan content upload using map-based search scenarios.

\textsuperscript{135} Influence in social media is often defined in terms of earlier contributions or peer review ratings.
8.1.3. Knowability and transparency

The knowability about cases under debate and the retrieval of contextual information was partly based on experience with earlier portals applied for the UK tradition of petitioning. UK eParticipation facilities (Howe, 2014) carry several features for finding important issues, such as: ‘what’s hot’, ‘top level’ discussions based on the amount of activity and public ratings (see figure 5). By combining this ranking functionality with the geographic overview (one can select an area and find the ranked discussions in that area) the user is provided with an overview of relevant deliberations going on in the co-regulation portal. The overview is necessary because stakeholders had expressed the need for support against the ‘feeling of having missed something crucial’ in the policy making arena.

Figure 5: Design ideas about the facilitation of knowability (Lobby and Forum support in combination with legal sources and geographical features as shown in the next figure).

Figure 6: the map query function (amplifying glass) provides knowability for case assessment.

Figure 6 displays two functions that support knowability: The query button (amplifying glass) that enables choosing a square on the map with the mouse that activates a query for the discussions for that specific chosen area and the listing of those discussions under the tabs (in this case the tab research reports). The colored flames and hammers and wigs are icons that indicate ratings for ‘hotness of the discussion’, ‘timing near decision’ making and ‘importance of the source’. This function can be enabled by a timer, in order to retrieve a log of discussions in the past.
8.1.4. Opportunity Finding

We include several forms or modalities of opportunity finding. The next sections will elaborate upon these different forms.

Opportunity finding using text entry

The affordance of using a keyword or user scenario in order to discover relevant content or opportunities for the actor was in principle demonstrated in Chapter [IV] by Legal Atlas. The relationship between a keyword or a cluster of keywords (user scenario) and relevant areas that are regulated by local, regional, and national policies is based on the same principles. As described in Chapter [VII], the existing legal regimes and new ideas can be matched using the ‘Handreiking’ under legal content management tasks and the same IMRO land utilization mechanism as the one deployed for Legal Atlas. The keyword listing described in Chapter [VII] was integrated in the end user interface.

Opportunity finding using map to text (legal source)

The way I chose to create additional affordances of more negotiation space using map-to-text (map to legal source document) was by allowing for ‘uploading documents through a map contour’. A stakeholder would be able to upload and download content for the area, such as a discussion document or a design picture or an alternative spatial planning map. This affordance had been used by the GIS supplier Bentley to create effective project management by uploading documents for each section of a large building.

Figure 7: Map-to-text enhancement in the legal service portal provided by the ability to upload localized documents. The documents are gathered from other actors, many websites, European legislation, and the regional legislator.

http://www.bentley.com/nl-NL/Products/Bentley+Geospatial+Management/
In this application, Google maps technology was used next to GIS technology to support ‘contour editing’ (the blue square) by visitors of the website. The visitor of the portal can indicate an area by drawing a line on the map to discuss and to support his case with documents, research reports, legislation, and plans that can be uploaded, stored, and downloaded for the given drawn area. In figure 7, you see a RECRON recreational analyses report found by a visitor. The document retrieved in this particular screen dump example shows the relevant research report as “hit” upon entering the keyword algemeen rec (recreation_general) in the search field. The hits are also restricted to the blue squared area drawn on the map by the user. Resources can be uploaded and downloaded the same way. That specific recreational analyses report was one of the documents uploaded earlier by the RECRON. The interface of this prototype is linked to the Oracle database of the regional authority Flevoland. All map layers available from that native system can be projected on this Google map screen. This way, the solution design will maintain dynamic input from legal constraints and map layer updates (Peters, van Engers, and Woudenberg, 2009).

Opportunity finding and automated detection of conflicts of interests
A core element of our case that is focused on co-regulation is to support finding and taking into consideration potential conflicts of interests between different plans resulting from different stakeholders’. Finding a technical solution for this special form of opportunity finding, i.e. finding the opportunity to debate margins, negotiation space and alternatives, was a major challenge. In Chapter [VII], I have argued that INSPIRE Maps showing Natura2000 areas or sites should enable the functionality (affordance) of flexibility in the form of ‘seeking areas’. The ‘zoekgebied’, or ‘seeking area’, is an official legal term for a specific geographic contour of activity opportunity, balancing, and compensation. I have argued that this would provide more negotiation space as compared to ‘static’ legal paper-printed maps.

Figure 8: The Game SimcityEdu, the latest version developed specifically for educative purposes in balancing interests.

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137 Dutch recreational umbrella businesses agency: http://www.recron.nl/
138 http://pc.ng-gamer.nl/nieuws/23150/1/SimCityEDU-stelt-SimCity-beschikbaar-voor-leerkrachten
Hoekstra has argued for the use of the attribute ‘adjacency’ to be able to argue with maps and legal constraints (Hoekstra 2010). Hoekstra’s Adjacency could be interpreted as ‘next to’, however. In addition to this version of the attribute, to put more emphasis on the dynamic properties, I argue a case for less or more nearness or proximity. Adjacency translates in Webster as ‘proximity’, ‘closeness’, or ‘nearness’. The reasoning is sometimes called ‘multiple constraint satisfaction’. This concept is not new: Simcity game developers who created manoeuvrability using a cursor and ‘tiles’ with fixed business rules developed this approach already in 1985. In that year, the Simcity game was still called ‘Micropolis’ (Wright, 2004). Simcity enabled the player to run a city by building or removing items on the ‘tiles’. The business rules were dependent on the scenarios and the idea of balancing a system ecology.

Figure 9: Simcity: on-the-fly Multiple constraint satisfaction using attributed mouse in 1985.

The interesting part is that the player was constantly choosing an ‘activity scenario’ or land use scenario like building, housing, or recreation and moving his mouse-cursor to find the right spot. The rules in the software driving the map-interface depicting a city dictated whether a spot would turn red or green, thereby indicating that that specific geographic area (the tile) was available for a business activity like ‘construction’, ‘road’, or ‘recreation’ given the ‘underwater city rulings’. It is only now, almost thirty years later, that we can contemplate a similar concept for a legal infrastructure in the real world (Peters and Hoekstra, 2009). It is also interesting to see that the standardization of open GML standards has evolved into WMTS and WFTS type of interoperability. The T stands for ‘tile’ which provides the opportunity for web service processing speed and tile-based attributes on a map. Simcity-like functionality (see http://simcity.ea.com/playsimcity_classic.php) resembles the functionality required for offering opportunity finding for debating alternative land use activities in a so-called ‘seeking

Please note that ‘the mouse’ was invented in 1972 by Englebart, only 13 years earlier
area’. The consideration element in the policy making portal is that - not unlike in many gaming scenario’s - the user has to take into consideration the plans of other actors.

In all of these cases, the major means to tie together the two types of information – photos and maps, traffic data and maps, or legal texts and maps – is to determine the overlap of use case scenarios or keywords that are meaningful in both domains. This is a semantic match.

8.1.5. Using Semantic web technology to identify conflicts

This match is obtained by the application of semantic web technology. Therefore, to connect maps to texts and vice versa, the two should be annotated using the same set of metadata (Winkels et al, 2007). The reason why we chose RDF/OWL is that we are able to do inference and reasoning with these legal constraint models based on land use. As described earlier (in Chapter VII), the knowledge models about the legal constraints and the domain knowledge of the business activity scenarios are described in conflict matrices.

Rules and restrictions can naturally be grouped by area of effect, thus allowing us to reason with and visualize gradual increase of conflicts between land use activities using an approximation mechanism. In practice we might e.g. want to prevent the development of a speed boat lane or an industrial zone adjacent (in close approximation) to a nature reserve. We can use adjacency information to apply a larger number of relevant legal norms (multiple constraint satisfaction) to an area, than we would be able to do without this information (Hoekstra et al., 2010). To publish this information as a service, an OpenRDF Sesame server was used. This server has a SPARQL-endpoint which is an access point to which SPARQL queries can be sent. SPARQL is a well-known database language for RDF databases (repositories). The SPARQL endpoint is accessible through the Web. The RDF that is stored within the OpenRDF Sesame server is processed with OWLIM. OWLIM is a high-performance semantic repository. It is packaged as a Storage and Inference Layer (SAIL) for the Sesame RDF database. It reasons about the RDF data and propagates this by means of rule-entailment. The SPARQL endpoint is used to fill up the legal service portal with information. The intended legal service portal (Legal Atlas III) can be seen as an interface for the OpenRDF Sesame server and the SPARQL-endpoint is the interface between them. The SPARQL queries result in retrieving the data from the conflict matrices that are implemented in RDF/OWL. To make sure that the SPARQL queries are able to retrieve the content, different content should be annotated with the RDF/OWL models.

Web Services

The application is based on the presence of two so-called web services. These are the SPARQL endpoint, containing our OWL repository, and a GeoServer, capable of supplying geographical data. Both services are capable of processing GET requests. In this context, a GET request is a query where all the relevant data are put in the URL, like a hyperlink. This
makes communication with the server maximally transparent, as you can see the exact result of the query in your browser. The technology as outlined here was later described as the semantic broker layer in complex webservice architectures (Naviti et al, 2012). Navity argues that the complexity of navigating pluriform domain-information requires an architecture that allows for brokerage at the semantic level. (Naviti, p5, 2012) he calls it an ‘ecosystem of infrastructures’. This research, that resulted in GEOSS, the global earth observation system of systems, confirms our earlier attempts with regards to legal information. The GeoServer is accessed through a protocol called WFS, which stands for Web Feature Service. In Geographical Information Systems (GIS), a polygon on the map is referred to as a ‘feature’. Features are grouped into layers referred to as ‘typenames’. Because our knowledge is stored in the OWL repository, we usually already know a feature’s ID; therefore, we need to retrieve its coordinates from the server. To do this, we need to specify the parameters in a GET-request, as in the following example:

http://dev.leibnizcenter.org:8001/geoserver/wfs?
request=GetFeature&
service=WFS&
version=1.0.1&
typename=feed:beb_stedelijkgebied&
featureid=beb_stedelijkgebied.3&
srsName=EPSG:4326

We specify the srsName to make sure the coordinates are returned in the right coordinate system. We discovered a quirk in WFS queries, if you specify the srsName before the typename, the coordinates are returned in the reversed order (lattitude-longitude instead of longitude-latitude). Sometimes, we need to retrieve more than one polygon from more than one layer; this is done with a WFS MultiFilter request. It allows us to specify a number of typenames, followed by a number of filters, each of which will be applied to its respective typename result. An example query could look as follows:

http://dev.leibnizcenter.org:8001/geoserver/wfs?
request=GetFeature&
service=WFS&
version=1.0.1&
typename=feed:beb_stedelijkgebied,feed:recr_openwater&
srsName=EPSG:4326&
filter= (<Filter xmlns=";http://www.opengis.net/ogc;">http://www.opengis.net/ogc">;
<FeatureId fid="beb_stedelijkgebied.4">;
</Filter>)
(</Filter xmlns="http://www.opengis.net/ogc">;
<FeatureId fid="recr_openwater.1";>
</FeatureId>)
Figure 10 (Peters, Hoekstra and Hupkes, 2009) give a picture of the architecture of the interaction between the representation portal and the reasoning engine. We use SPARQL queries for retrieving domain information using the IMRO2006 and SKOS vocabulary. The legal service portal gets its information by sending the appropriate queries to the Sparql Endpoint. The SPARQL endpoint is an access point to the OpenRDF Sesame server. The OWLIM is an inference layer within the OpenRDF Sesame server. The description of the various and often quite complex queries are beyond the scope of this thesis. For the technical details of the different technological components and ontologies I refer to Peters, Hoekstra, Hupkes, 2009.

The architecture and the application we have realized based upon that architecture allowed us to represent maps that contain a high number of different areas of some type of land use. When digitalised in a web portal, these areas have a particular geographical representation in the form of layers with polygons. The co-regulation portal also provides an interface for adding or uploading documents and connecting them to an area on the map. Adding new data requires new tagging with metadata. The engine adds RDF/OWL metadata content to the models. The OWLIM module then processes these and the result is propagated to the legal service portal by the same SPARQL endpoint. One recognises a conflict between

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IMRO: Informatiemodel Ruimtelijke Ordening (information model for spatial planning), http://www.geonovum.nl/dossiers/rostandaarden/destandaarden
two types of land use while the user browses over the map with an ‘attributed cursor’. If an area stands in some relation to another area that is incompatible with their respective types of land use the cursor will indicate this conflict by changing its color. Within IMRO, the land use always attached to a specific land use code that refers to a specific set of legal constraints. The land use ‘industry’ is well defined with a set of articles explaining the rules always attached to it. The same holds for ‘nature’. These rules may clash of course, which is for instance the case when an industrial area overlaps with a nature reserve. These clashes are to be found and visualized in our map-based interface. In figure 11 you can find again the ‘conflict matrix’ from Chapter [VII] that was based on the ‘handreiking’ and that feeds the OWL classification structure with knowledge about the domain (Normative Content).

Figure 11: ‘conflict matrix’ based on the ‘handreiking’ that feeds the OWL classification structure with knowledge about the domain (Normative Content).

The normative content of spatial plans is then represented by specifying OWL descriptions of those situations, e.g., areas that are allowed or disallowed by a spatial plan.
Figure 12: The figure describes the relations between classes that result in either allowed or disallowed overlappings between concepts (land use concepts and region concepts) in those well defined classes.

It should be stressed that traditional spatial plans usually only specify the areas where a particular type of land use is allowed, rather than the exclusion relations between types of land use. The latter is typically delegated to the land use categorization schema (see figure 13 on page 333).
In order to being able to retrieve the applicable source documents we described some important relations in our RDF schema:

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rdf:type</td>
<td>Relates any rdf:Resource to its type (convenient shorthand: a).</td>
</tr>
<tr>
<td>rdfs:label</td>
<td>Provides a human readable name for any rdf:Resource.</td>
</tr>
<tr>
<td>rdfs:comment</td>
<td>Provides a human readable comment for any rdf:Resource. We use this property to provide the text for all text blocks.</td>
</tr>
<tr>
<td>lio:keyword</td>
<td>Connects any text (document, regulation) to a skos:Concept keyword.</td>
</tr>
<tr>
<td>lio:status</td>
<td>Connects any text (document, regulation) to the lio: Status that indicates whether that text is e.g. legally binding.</td>
</tr>
<tr>
<td>lio:describes</td>
<td>Connects any text (document, regulation) to the lio: Map it describes.</td>
</tr>
<tr>
<td>lio:src</td>
<td>Connects any text to the physical location of that text (on the web).</td>
</tr>
<tr>
<td>metalex:parent</td>
<td>Connects a part of text (e.g. some paragraph) to the text it belongs to (e.g. a document).</td>
</tr>
<tr>
<td>rdfs:isDefinedBy</td>
<td>Connects a domain concept to the keywords that define it.</td>
</tr>
<tr>
<td>rdfs:seeAlso</td>
<td>Connects synonymous keywords to each other (used in a.o. the omgevingsplan).</td>
</tr>
<tr>
<td>skos:member</td>
<td>Relates a skos:Collection keyword collection to its members (skos:Concept).</td>
</tr>
<tr>
<td>skos:inScheme</td>
<td>Relates a keyword (a skos:Concept) to the scheme it is defined in (e.g. IMRO2006).</td>
</tr>
<tr>
<td>skos:narrower and skos:broader</td>
<td>Relates a keyword to its more specific and more generic terms, respectively.</td>
</tr>
</tbody>
</table>

Reasoning about conflict in land use which may be the result of difference between actual plans and new designations is realized using a classifier. In other words the entire problem is conceptualized as categorization problem, for which OWL-DL, a specific description logic that can be used by classifiers such as Pellet can work with. The designations of certain areas are described as classes, for example the designation ‘Industry’ is described as a class ‘ex:Industry’ being sub-class of a super-class ‘la:Land Use’. Likewise the designation ‘Nature’ is described as another sub-class ‘ex:Nature’ of the same super-class. Furthermore a specific area can be member of either the class ‘ex:Industry’ or ‘ex:Nature’.

**Class:** ex:Industry:
**SubClassOf:** la:Land_Use

**Class:** ex:Nature:
**SubClassOf:** la:Land_Use
Correspondingly we can define two regions, `ex:IndustryRegion` and `ex:NatureRegion`, both of which are subclasses of `la:Region`, for which we define that their land use (`la:land_use`) is respectively ‘`ex:Industry’ or ‘`ex:Nature’.

**Class:** `ex:IndustryRegion`:
**EquivalentClass:** `la:Region` that `la:land_use` some `ex:Industry`

**Class:** `ex:NatureRegion`:
**EquivalentClass:** `la:Region` that `la:land_use` some `ex:Nature`

We can define the mapping between the corresponding land use categories and the IMRO categories by assigning them as individuals belonging to their respective classes.

**Individual:** `imro:industry`:
**Type:** `ex:Industry`

**Individual:** `imro:nature`:
**Type:** `ex:Nature`

This representation has a number of benefits, the most important being that our representation of land use is independent of the categorization scheme adopted. For instance, we can map `gemet:industry` to `ex:Industry` in the same way, allowing us to specify norms on both IMRO and GEMET\textsuperscript{141} encoded maps. In order to define norm conflicts we have define subclass of the super set norm. The subclass ‘`NoOverlapIN`’ indicates the presence of such conflict.norm:`NoOverlapIN` thus can be used to define that an overlap between these two types of regions is not allowed. We can express that a region that is an instance of class ‘`ex:IndustryRegion`’ and an instance of a class ‘`ex:NatureRegion`’ lead to a norm conflict. We also want to express that this is a subclass of the class ‘`norm:ConflictRegion`’. This would result in the following expression:

**Class:** `norm:NoOverlapIN`:
**EquivalentClass:** `ex:IndustryRegion` that `la:overlaps` some `ex:NatureRegion`
**SubClassOf:** `norm:ConflictRegion`

*Figure 13 on the next page* illustrates the representation of spatial norms and land use. It depicts two types of land use: `ex:Industry` and `ex:Nature`, both of which are subclasses of the general class of `la:Land_Use`.

As an illustration of the representation format, consider the following spatial plan, specifying a single region (Polygon) with land use:

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\textsuperscript{141} GEMET is relevant for European applicability, see INSPIRE.
A user draws in the web portal interface with his mouse a region ex:region_industry and specifies its land use to be IMRO: industry. The system queries the GIS server to find all regions that ex:region_industry overlaps with. Suppose in this case we find ex:region_nature, we then update the repository with the assertion:

**Individual:** ex:region_industry;
**Facts:** la:overlaps ex:region_nature
la:overlaps(ex:region_industry; ex:region_nature)

The third step is to perform OWL 2 DL realization on the knowledge base. This will infer that ex:region_industry is of type ex:IndustryRegion and that ex:region_nature is of type ex:NatureRegion (*the dotted lines in figure 13 above*). However, ex:region_industry also meets the requirements of norm:NoOverlapIN, and we can, therefore, infer that ex:region_industry belongs to that class as well.

Finally, the system will gather all individuals of the class norm: ConflictRegion using a simple SPARQL query;

```
SELECT ?region
WHERE { ?region rdf:type norm:ConflictRegion }
```

Because norm:NoOverlapIN is a subclass of norm:ConflictRegion, ex:region_industry will be bound to the ?region variable. The system will bring this fact to the attention of the user by highlighting his or her region on the map.

Finally, the system will gather all individuals of the class; norm: ConflictRegion using a simple SPARQL query;

```
SELECT ?region
WHERE { ?region rdf:type norm:ConflictRegion .}
```

Because norm:NoOverlapIN is a subclass of norm:ConflictRegion, ex:region industry will be bound to the ?region variable.

The system will bring this fact to the attention of the user by **highlighting this region** (polygon) on the map in **red**. It is important to note that the OWL models themselves do not become inconsistent, which would have been a problem for first order logic based models and corresponding reasoners, but that we use a pure classifier based solutions where the allowed and disallowed situations are both represented as different classes expressed in OWL. It is now possible to represent the disallowed situations and its regions as conflicts on the map.
The technology briefly described here has been realized and thus demonstrates the feasibility of the desired Simcity-like affordance of a seeking area.

Figure 13: Representation of norms in spatial regulations. Ovals indicate classes, solid boxes instance, dashed boxes restrictions, solid arrows explicit relations, dashed arrows inferred relations (Hoekstra et al., 2012).

8.1.6. Visualisation of consideration and negotiation space

While the section above demonstrates the technological feasibility of the desired Simcity-like affordance mechanism, we also have to build a user supporting interface. In Chapter [VII] the problem with a traditional design of map layer based visualisation of legal regimes was described. Below you can see how this traditional approach can be visualised in the new portal. The Natura 2000 regime would then be visualized by showing yellow striping that negates all possibilities of entering any other scenario.
**Figure 14** shows Natura 2000 Directive that usually is associated by policymakers as blocking all activities as indicated by yellow striping; yet another version of figure 11 in Chapter VII. In the pictures below, I made a visualisation of the Simcity concept into a legal context with three paper printed sheets. They concern the searching area for an ‘estuary’, a new wild swamp area that requires silence and protection (later to become the Marker Wadden). The blue spot is the attributed cursor which has as attribute a ‘recreational island’.

**Figure 14: Natura2000 Directive digitally represented in yellow striping that suggests that all activities are blocked in that area.**

To support the actors in the explicit exploration of the negotiation space – in line with Carver, Habermas and Oosterhout – another design is required. For that reason, we have made some drafts of the desired visualization for which we started with maps as were used with the traditional paper-based methods. I have explained this approach earlier, but for the comfort of the reader I will summarize this again below.

The possibility to move the cursor on the digital version of the sheet and find out when the orange colour changes into red enables the stakeholder to know how much negotiation space is available given the legal and policy constraints. Such space is relevant, since the ‘loudness’ of recreational activities and the need for quiet and silence near (adjacent to) an estuary are arbitrary qualifications. It is a matter of consideration and negotiation. The assumption is that this affordance would decrease the chances of ending up in court. This was one of the main drivers for Experiment [III].

The ‘searching area’ is in fact a way to negotiate legal planning alternatives, without the limitations of paper representation or the simplistic representation as showed figure 15. A digital searching area would have to be an ‘attributed mouse’ with a specific set of

142 Source: J. Perk, Policy advisor, Flevoland
characteristics that are or are not in conflict with the characteristics of the area the user moves the mouse to.

**Figure 15:** Attributed cursor concept that should enable ‘zoekgebied’ or searching area providing support for negotiations as described in Chapter [VII].

Instead of the dichotomous ‘can’ versus ‘can not’ we would like to support a level of conflict approach that could be based on adjacency of map regions and distance. This way we could support deliberation that would go beyond the traditional black-or-white discussions, but instead allow for a matter of relative nearness and balancing interests. The orange colour in the figure 17 above means ‘perhaps’ and ‘requires negotiation’. The visualisation of negotiating space required a design that gave significance to the attribute ‘maybe conflicting’ in the mapping matrix described earlier in Chapter [VII].

**Example 1: a plan that implicates building and construction**

Figures 16-24 below depicts the working legal service portal that enables that visualisation of negotiation space as explained in the previous section. In the example scenarios that are demonstrated, one can find the small blue angled form (Fig 18) – Polygon in GIS terminology – that has the legal characteristics of ‘building and construction’ in the Flevoland area near the ‘Houtribdijk’. The Blue form is shaped by the user in a form that simulated the spatial shape of the intended construction plan.

**Figure 16 (to the right):** attributed mouse in the form of a moving blue Polygon, and **Figure 17:** dots placed on the map connect in the required shape of the plan of action that turns into a blue shape, in this case a triangle.
This plan is shaped by placing dots on the map. The software connects the dots and generates the colour blue for the space mow encircled by those dots. Another example is the plan in the form of a triangle in fig 17. The now blue coloured plan-shape is connected to the mouse and contains the attributes of the scenario of the plan of action.

Figure 18 shows the blue shaped plan of action moved into the adjacency (adjacency in the meaning of proximity) of a number of red shapes indicating other plans of action, ‘green’ documents and ‘red’ documents. The blue-coloured shape is now in fact the ‘attributed mouse’, shaped as an estimate of the future spatial design of the intentions (for example, building and construction). The colour blue of the attributed mouse indicates that it could be allowed in the area covered by the shape, but NOT in the adjacent areas of the red shapes. The documents are legal source documents or documents about plans that may or may not be in conflict with the plan that is now being introduced by the cursor. The documents carrying a ‘red’ signature indicate probably conflicting legal norms or interests. Naturally, the documents can be retrieved by clicking on them.

In the next figure one can see that the ‘blue’ shape (Polygon) has turned red after moving it by mouse in the southern direction where it encounters an area governed by the City of Lelystadregulations concerning the northern coastal line under the Houtribdijk, where buildings and constructions are not an option due to the small transport corridor.

Figure 18: Legal service application with mouse-operated blue squared constructions object moving over existing plans and location related legal source documents. Clicking on the document icons provides the document itself.
Figure 19 on the next page shows the blue square searching area has turned red because the legal source document indicates land use permission in the searched area that is in conflict with the attributes given to the mouse operated searching area. Increased transparency provides the notion of nearness in terms of degree of allowance and disallowance.

In the pictures above, the ‘maybe conflicting’ parameter was achieved by increasing or decreasing the transparency of the red shaped areas. In practical terms, it indicates a decrease of chances to achieve agreement in the balancing of interests. In legal terms, it means the introduction of spatial regulative flexibility. In experiment [III], I hope to substantiate the claim that stakeholders are looking for this type of affordance. The increase or decrease of transparency also reduces the information overload of the graphical interface. Otherwise the screen would have been clouded with all plans that were previously uploaded by other actors.

Example 2: establishing a yachting Marine

In the figures 20-22 one finds an example of a plan for a yachting marine. The documents can be retrieved based on categorizations (such as research reports like environmental effect investigations concerning alternative plans, minutes of workshops and meetings) and on the bases of geographic location and on the bases of the annotations (the icons mentioned earlier). The documents can also be movies or pictures of other files from any kind. When the cursor is moved towards a building area (plans for a new island!) the blue plan turns red.
Figure 20: Searching an area with a plan for a yachting harbor.

Figure 21: approaching an area with other plans where such recreation is not conflicting.

Figure 22: Searching in an area where building is intended. A conflict arises. The square for the Mariner plan turns red.
Example 3: Example of the establishment of an estuary.

Below one finds the example of an estuary that was intended as the compensating actions in view of the Natura2000 policies. These rules dictate, that one has to stimulate the ecology as much as one damages the environment. These ecological counter measures are often subject to heated debates and questions who is to offer up space for them.\footnote{143}

Figure 23: Plan envisioned for Estuaria (blue/ area later to become the Marker Wadden) being moved towards the area where other plans already exist.

Figure 24: More plans become gradually visible, but no conflict is found yet.

\footnote{143}{The Hedwige polder flooding as compensating measurements for the Westerschelde was cause for an international conflict between Belgium and the Netherlands}
Figure 25: The plan turns red when the area overlaps within a searching area where the policies or plans contradict.

Figure 26: Legal source document retrieval of the specific legal constraint that blocked the plan.

In the example above the document that blocked that specific location of the estuary indicated a research article about ground level stabilization. Many areas in the Netherlands tend to ‘sink’ and there are norms about area’s where activity is restricted because of the need to re-lift the ground levels.
8.2. Conclusions

The following functions were described as part of this feasibility test.

1. **Moderator support** (Forum support, flexible, fast iterations, fast consensus building, effect demonstration, plurifom).
2. **Content management** support as described in Chapter [VII].
3. **Knowability** about cases.
   - The function for actors to get overview of debate history (transparency).
   - The function for actors to get overview of content and content ownership (overview).
4. **Opportunity finding** by using keywords or user scenarios (earlier described as text-to-map in legal planning).
5. **Modelling support between policies, norms and the system parameters**, including the visualization of the results of applying inference processes on various types of domain knowledge.
6. **Negotiation support**, refined into the following tasks:
   - The function to explore negotiation space and take the interests and plans of other actors into consideration.
   - The function to explore searching areas, balancing interests against other interests.
   - The function for actors to upload their own views and content for a certain area or plan.
   - Visualisation of (past) explorations of actors in the negotiation space (to ensure that actors can see the explicit attempts at hamonisation of plans of action of other actors – in line with Habermas, Carver and Oosterhout).
     I will call this consideration technology.

The research questions for this chapter were in fact feasibility studies for which I have chosen a very pragmatic approach where feasibility is translated into the question; can it be done?

Function 5 has been shown in this chapter applied to a co-regulation portal and we have shown the flexible semantic technology based design in some detail. The ability to seek areas with plans and contradicting plans has been shown in screen dumps in the pages above. **We can therefore conclude that building a portal as defined is feasible.**

At this stage we haven’t yet demonstrated the required possibilities to align our solution with operational systems in Flevoland or any other Dutch regional authority. Instead we were satisfied with the assumptions of the living lab team that included the officers responsible for that future task, that our solution could be aligned with existing systems. The actual technical integration test occurred much later and after experiment III. Some of these integration aspects will be described as part of the next Chapter. All the challenges could justify a research program in themselves, but this is not the purpose of the
chapter in the context of legitimacy of law. The descriptions in the sections above do support the fact that most of the content management, technical and representation challenges can be met.

8.4. Reflection

The question of content organization is perhaps the most interesting from a legal point of view. The ‘street-level bureaucrat’ is replaced by the ‘digital or system bureaucrat’; the designer of business rules that power computerized systems in eGovernment processes. Little is known about the methods for reduction of complexity (from political realities of do’s and don’ts) that those designers apply. It seems to be a craft. The translation from policy intentions into the business rules that drive the outcome of a legal service is not only a challenge for the government officer. It also proved to be the pivotal point in the discussion between technicians and policy makers where the ‘iteration rate’ between experts suggesting technical possibilities and experts clarifying user needs is at its highest peak. This iteration is almost impossible to achieve in traditional tendering- and procurement processes. For that reason, I will address this topic in Chapter XI in more detail. Co-regulation supported by a Legal App may depend on our capability to organize the digital translation in transparent ways (Grimmelikhuijsen, 2012).
A focus group test in Experiment [III]
9.1. Overview

In Chapter [VI] a conceptual base for co-regulation was established. A number of research questions were addressed, like trust in technology, the digital bureaucrat influence and the extent to which ‘prosumers’ and moderators in legislative processes would be supported by new technology.

In Chapter [VII] a number of ‘gaps’ were identified in current technology designs supporting legislation, like legal argumentation support based on tools, such as Parimenides, and research areas, such as PPGIS.

At the end of Chapter [VII] the requirements for the real life use case (IJmeer/Markermeer) were identified, including the moderator needs that would have to be tested to support such a co-regulation process with technology and design. In Chapter [VII], Flevoland was chosen as the representative test arena, thereby proving the feasibility of the concepts in the context of an existing public legislative authority’s back office.

In Chapter [VIII] the technical feasibility issues were described for a portal providing a legal service for co-regulation based on the standards and principles as described in Chapter [IV]. The technical foundations were based on research and design in legal format standardisation (CEN/Metalex), in semantic technology (application of OWL and RDF), in special usability affordances related to map technology, such as seen in SimCity, and, finally, in novelties like “seeking areas”. In the living lab setting, by applying a conflict matrix to use case scenarios in the world of business managers, we were able to map intended or fictional policies to a solution that contained a reasoning engine “behind” the map, amongst others.

This design was followed by a feasibility test on a number of requirements as formulated by public authority participants and professional policy-making moderators, like legal content management, maintainability, and alignment with the back office of a legislative authority.

Chapter [IX] will address a qualitative test with a focus group as part of Experiment [III], as well as the research methods applied and their results. A questionnaire was given to the focus group of stakeholders that were involved in an actual case. In this chapter the research protocol and the list of stakeholders will be clarified. The survey enabled me to obtain many details of the co-regulation process and the substantiation of feasibility and relevance in the real life world of technological interventions. I will conclude the chapter with the description of the actions of the Regional Legislator Flevoland in order to provide insight into that part of the results’ validation of the living lab co-development process of the legal service infrastructure.
9.2. The research questions for the focus group test in Experiment [III]

I have designed a legislative service platform based on architectural principles and with most of the required functionality identified in Chapter [III], [VII] and [VIII] in place. The research question is now to discover if stakeholders in a real NIMBY case with conflicting interests perceive such a platform as a contribution to their legal design problem. Such legal design typically starts with finding some agreement between the most important stakeholders before turning the outcomes in some regulation. Stakeholders have been identified as both the legislative authorities and the non-governmental players, since that is the essence of co-regulation. The sub-question I have addressed in this Experiment III is:

Is our legal service portal design for co-regulation perceived as supportive by the stakeholders in the context of balancing a real world conflict of interests (NIMBY-situation)?

The design challenge is met successfully under this condition: A defined majority of the users prefer the legal service portal working on a dynamic legal map over the traditional system working with a static paper legal map.

The design challenge has not been met successfully under this condition: A defined majority finds the proposed system less useful compared to the existing practice for their tasks.

9.2.1. Operationalization

The preference is operationalised on the basis of twelve criteria for which we’ll use twelve corresponding indicators. The key indicators we’ll use to measure if the new solution is an improvement of existing practice were derived from the moderator and actor views (see conclusions of Chapter [VI]) that participated in the open discourse that is also the setting of the experiment. These key indicators are the following:

- **Appreciation of functions digital GIS over paper maps** (agenda setting, exploration, and policy formulation stage)
- **Ease to convey legislative complexity** (explanatory and constraint satisfaction stage)
- **Ease to inform constituency of stakeholders** (explanatory and exploration stage)
- **Ease to supervise relevant discussions** (explanatory and explorative stage)

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144 The popular term “not-in-my-backyard” is used here because it signifies the societal relevance of the problem domain. In everyday life, public authorities have to find a way to superimpose the placement of unwanted facilities (wind mills, asylum centers, factories, shopping malls, bridges, roads, power plants, etc.) near citizens who resist this placement.
- **Perception of better insight into legal constraints** (constraint satisfaction stage)
- **Perceived ability to balance interests against other interests** (constraint satisfaction stage)
- **Perceived relevancy of features of legal service portal are made available** (all stages)
- **Contribution to transparency** (explanatory and exploration stage)
- **Perceived ability to bring forward interests** (decision stage)
- **Contribution to well-managed decision process** (decision stage)
- **Perceived decreased chances to end up in court** (enforcement stage)
- **Perceived direct influence on decision** (decision stage)

Nine of these criteria are relevant for the explorative, constraint satisfaction, policy formulation, and explanatory stages of policy making and co-regulation in accordance with the model of Wyner, Atkinson, and Bench Capon (corresponding with indicators 1 to 9). Three of the criteria (indicators 10-12) address the decision stage and the enforcement stage as defined by Wyner, Atkinson, and Bench Capon (2011). These criteria address issues that typically come much later in the policy lifecycle.

**Figure 1. Stages in policy making, see also Chapter [VI].**
The key indicators 1-9 are rated positively when the score on the questions about the criteria during the interviews is higher than 50%. I have chosen to take 50% here as this means that in that case a majority of the stakeholders would prefer the new support system better than existing practice.

With respect to the outcome later in the policy lifecycle, that is where we may be confronted with long taking and expensive court cases, I have chosen to use a different cut-off value, i.e. 20%. If 20% of the respondents score that they expect the chance of ending up in court decreases by using the co-regulation portal, the score is positive. Therefore the key indicators 10-12 are rated positively when the score on the questions about these criteria is higher than 20%.

The reason for the distinction between the two categories of indicators is, that the actors have stated that societal costs at later stages are higher and a small contribution of technology to the legislative process would increase legitimacy (see model Chapter [VI]).

9.2.2. The experiment focus group choice

The co-regulation process has different stakeholders and stages. Actors vary from stage to stage. In the agenda setting stage and explorative stage of the IJmeer/Markermeer case, hundreds of people were involved in larger sessions. This is typical for these types of cases, according to the respondents. In the policy formulation stage, typically a number of sessions with expert groups and representatives of pressure groups are held over a period of time (see Chapter [VII]). This sequence has several online consultation rounds using several websites. When a fixed set of alternative planning scenarios has been chosen, the number of actors decreases to those who represent important stakeholders. The protocol for the exploration stage, advice stage, and decision-making stage regarding final scenarios and the final decision-making voting in the Provincial Council was well defined in many documents and websites of Flevoland. The stakeholders chosen for the focus group entered into final negotiations regarding planning scenarios at the decision stage. I have chosen this group as a relevant feedback group for the technical design because they have been appointed by those they represent to make decisions.

As part of the living lab research, I had to ensure that the stakeholders in the focus group were representative of the intended groups of actors. The IJmeer/Markermeer case involved investments of 50-150 million Euro depending on the scope definition. These stakeholders were those that have been chosen or appointed to represent their constituencies in the decision stage about planning scenarios for the Omgevingsplan, which is the legal source document that drives most of future planning decisions. In all cases they made themselves known to the regional authority as a stakeholder. The appointment procedure of these actors varied from organisation to organisation, but as I had no influence whatsoever on this selection process within the constituencies the selection process is not within the scope of this research. The stakeholders represented those constituencies that typically participate in these kinds of negotiation processes. As chief negotiators at this stage, they were in the position answer my questions about the effectiveness of the new solution. They were asked amongst others:
If the chosen case was representative for this type of cases in general.
If the technology would support them in explaining the outcome of the co-regulation process (which usually is a compromise that requires defending).
If the technology seemed useful in depicting the complexity of the case itself during exploration and negotiating.

To ensure the specific case was representative for other co-regulation processes, I asked all respondents what their opinion was about the relevance and representativity of the IJmeer/Markermeer case in their views as professional negotiators.

I invited 20 of those representatives as respondents in the focus group in the experiment. This number is close to the average number of stakeholders usually involved at this stage of co-regulation processes, according to the moderating authorities.

9.2.3. Experiment focus group test protocol

The experiment was conducted in the following manner:

1. Define test group of real actors
2. Check “conflict of interests characteristics”
3. Inquire about perceived current state of affairs in co-regulation (perception research)
4. Show demonstrator
5. Inquire about perceived potential for co-regulation (perception research)
6. Identify potential conclusions

It should be stressed that the definition of the actors that would participate in our experiment were not individually selected, as I have explained before. However together with the responsibles at the Province of Flevoland we invited identified stakeholders, i.e. constituencies that were asked to send their representatives. With respect to the “conflicting interest” characteristics mentioned in Chapter [VI], I operationalised this factor in a number of variables. These variables were translated in corresponding questions that I’ve put in the questionnaire that were answered by the participants of Experiment III. We used the following variables

- **Representative case**
  - Operationalisation: Representative in perception of stakeholders (Question 1 of the survey).

- **Complex interest-balancing act (NIMBY-type)**
  - Operationalisation: Complex as perceived by participants (Question 3 and 5).
  - Operationalisation: Complex in pluriformity of legal constraints (Question 4).

- **Complex in legal ambiguity**
  - Operationalised: Existing history of legal court cases (Question 11).
  - Legal pluriformity in view of all stakeholders (Question 6).
Ambiguity in evaluation metrics

- Operationalisation: Hard to explain nuances and evaluation to constituency of stakeholders in view of respondents (Question 9).

In order to assure that the selected case was representative for the co-regulation processes we aimed to support we also used as a criterium that the case used for our experiment concerned a spatial planning problem involving 50 million plus investments. Furthermore we looked at two other factors:

- Political risks
- Operationalisation: Public authority with political responsibility indicating risks.

- High conflicting interests
- Operationalisation: High stakes in terms of money or stakeholders involved.
  
  This variable “High” is derived from two perspectives:
  
  - The opinion of the regional authority about the importance and relevance of stakes (moderator).
  - The level of influence by law, media, or other means as perceived by the moderator.

The case should also include typical characteristics of spatial planning, including different conflicting legal regimes and different authorities having responsibilities. In this case the Regional Authority Flevoland was the main legislator with jurisdiction for the planning in the area. Different national and European legal regimes were applicable to the case, regimes that may overrule regional policies. The cities and municipalities involved have jurisdiction at a local level. There were multiple sectors involved, like transport, infrastructure, fishing, sand winning, as well as ecological considerations and housing issues; each sector is governed by their own sets of rules. The whole of the regulations together creates an abundance of legal pluriformity.

9.2.4. Population set up of the focus group test in Experiment [III]

The regional authority organised a number of consultation workshops and decision rounds. Those workshops and decision rounds would result in three zienswijzen, or alternatives, that would be submitted to the Provincial Council (Provinciale Staten) and the National Ministry for finalisation of the decision process. The actor group, that was selected as describe above, were formally invited by the Province and the University of Amsterdam in a joint letter to participate in a focus group test. The test was held on the same day as the ‘real’ and final discussion amongst these stakeholders. This is an indication of their role as stakeholders with real involvement and of their negotiating power. Twenty respondents representing different stakeholders participated in the experiment. Most had followed higher education and the average age was between 40 and 50 years old. The participants represented the constituencies listed in the figure below.
The focus group test was conducted on 26 May 2009 in the regional capital city of Lelystad at Bataviawerf, Province of Flevoland.

All participants were given questionnaires. The questionnaire had the following structure:

- An introduction and explanatory text.
- Some initial questions regarding age, sex, digital proficiency, level of education, etc.
- A Pre-demonstration set of 12 questions on a 5-point Likert scale.
- A check list with four questions to determine if the participants understood the demonstration.
- A post-demonstration set of 12 questions on a 5-point Likert scale.

The questions were mostly related to the criteria as described above. In addition, all questions were provided with clarification space and the explicit request to give a clarification in a few sentences. The participants were given an explanation about the research and the purpose of the questionnaires.

The participants were then asked to answer the first 11 questions. These concerned the following topics:

1. A. The relevancy of the IJmeer case (is it representative for larger NIMBY-type problems in view of the respondents?)
2. A. The way they perceived the current procedures
3. A. The quality of the weighing of different interests at stake in their perception
To determine if views on transparency would influence the judgement of the technological support system, I posed five questions about aspects of transparency.

These questions were:

- Do you think that increased transparency will slow down the policy making process?
- Do you think that transparency will increase the support for the decision?
- Do you think that increased transparency will contribute to a balanced decision?
- Do you think if transparency is a democratic necessity?
- Do you think that increased transparency only makes sense at the end of the policy making process done by experts?

Then we took a half hour for a detailed demonstration of the co-regulation application portal (see figure 3). The demonstration portal can be viewed at http://feed-dev.public-ity/visions.php?category_id=1. We allowed the participants to ask questions that would clarify the system. The demonstration protocol consisted of a number of steps.

Demonstration steps:

1. Legal service portal is shown on screen.
2. Walk through demonstration.
3. Click to quick scan map for retrieval.
4. Click to relevant zoom level.
5. Activate blue map searching area.
6. Explain to audience functionality of blue square.
7. Activate looking glass for keyword query.
8. Show document retrieval.
9. Show petition retrieval.
10. Show document upload facility.
12. Explain scenario metadata structure as possible way to annotate content.
13. Explain role of moderator.
After the demonstration we posed the participants a second list of questions.
The second list of question addressed the following topics:

1. Does the respondent think he or she will have more influence using the instrument just demonstrated?
2. Are the respondent’s interests easier to put forward with the demonstrated instrument?
3. Are the respondent’s interests better matched against other interests?
4. Does the instrument provide the respondent with a better insight into relevant juridical constraints?
5. Is the complexity of the case easier to convey for the respondent?
6. Is it easier to supervise all other discussions considering the case?
7. Is it easier to inform the respondent’s constituency with the instrument?
8. Would the instrument contribute to a better decision process?
9. Are the functionalities those the respondent requires for his support?
10. Are digital maps better for this type of case than paper maps?
11. Does the respondent think the instrument will contribute to the transparency of the decision process?
12. Does the respondent expect to sit in court sooner or later having used this instrument?
9.3. The Results of Experiment [III]

The results of one of the respondents were excluded from the sample because all his answers on the second set of questions were the same. His statement was “the system is incomplete and therefore not applicable”. Apparently, he refused to distinguish between a prototype and the real thing. Please note that here we use the term ‘decision process’ instead of ‘co-regulation process’. I decided to use simple terms in the questionnaire to avoid misunderstandings.

9.3.1. First set of questions

![Chart showing responses to the question: do you think the case is representative?]

- **very representative**: 0%
- **representative**: 22%
- **irrelevant**: 6%
- **not very representative**: 22%
- **absolutely not representative**: 50%
1. 68% (9 + 4 = 13 out of 19) thought the use case of IJmeer/Markermeer was typical or very typical of larger legal balancing problems. The (conflicting) arguments used by the ones who thought it was not entirely representative were as follows:

a. Usually more stakeholders
b. Usually fewer stakeholders
c. Broader involvement of stakeholders

Two respondents (11%) thought the answer irrelevant or had no opinion on the matter. Given these scores having a clear majority that considers the case as being representative, I conclude that the case is representative and therefore relevant for my research question.

2. 89% (17 out of 19) thought their interests were well or very well represented in the current procedures.

Some of the remarks were as follows:

- Good collaboration with the Ministry.
- Common entry gave this opportunity.
- Open process with active involvement of stakeholders, but decision moments not transparent.
- Relevant actors are there.
- Regular meetings and talks.
- The moderators (TMIJ, the collaborative effort) clearly mapped the way.
- If you are active, you will be represented.
- Many moments of interaction and participation.
- Content of policies are influenced.
- Autonomous process, region facilitates with balancing interests.
- They listen and remarks are recognised in new plans.

I can conclude that, despite these critical remarks made by some participants, the majority of respondents were actually quite satisfied with the current way of moderating for this use-case.

3. 63% (12 out of 19) thought their interests could be well balanced against other interests.

4. 74% (14 out of 19) thought they had sufficient insight into the legal constraints regarding the case.

5. 90% (17 out of 19) thought the complexity of interests with respect to the case were well or reasonably represented.
Some of the remarks were as follows:

- *Is very complex indeed, a lot of space left for people’s own interpretations.*
- *Complexity hard to describe.*
- *We try to influence through maps.*
- *Complex to describe because of many variants and options at this stage.*
- *Are involved for a long time, for many it is a black box.*
- *Networking.*
- *The deliberation process has been designed for it.*
- *It remains complex to stay objective in balancing all aspects.*
- *Double agendas and surprising solutions.*

It is interesting to observe that the last score, the score on complexity of interests, was quite high, but the remarks indicate the existence of a complexity issue. I conclude that the respondents judged the process to be adequate given the complexity issue.

6. Only 42% (8 out of 19) thought they could have an easy overview of all relevant discussions regarding the case; 53% (10 out of 19) stated it was not very easy to maintain overview.

Some of the remarks were as follows:

- *Is easy but costs lots of time.*
- *Some ideas (regarding the plans ed.) are wishes and it is unclear whose are applied in the area.*
- *Being from the government, it is easy to get involved.*
- *Takes a lot of years of hard work.*
- *Internet site is well made, informative and up-to-date.*
- *Too much, too many times, relevance unclear.*
- *Many issues, large area, many authorities, hard to follow.*
- *There is enough information available.*
- *We get a lot, but a lot more is happening around this topic that does not end on my desk.*
- *Many chess boards.*
- *Government levels keep working uncoordinated, apart from each other.*
- *A lot is happening at many levels, hard to get a grip on.*
- *Deals regional authority and environmental NGOs?*

These scores indicate serious issues with the existing practice. The remarks about overview clearly indicate an issue of quantitative overload and problems that come from the legal pluriformity that is typical in the use context.

7. 63% (12 out of 19) thought they could influence the decision-making process.
The remarks about perceived influence indicate mixed feelings of having power and some frustration. Note that these respondents were “professionals”. It is interesting to see two remarks about maps without being asked for. The score seems high.

8. All respondents were positive regarding the current protocol. None were less or not satisfied with the overall protocols and approach.

9. 58% (11 out of 19) thought they could inform their constituency sufficiently about the stakes in the case. 37% thought this was hard to accomplish.

Some of the remarks were as follows:

- Positioned close to the fire.
- Sharing knowledge, influencing managers.
- Through maps and participation.
- I deliver advice from the Ministry.
- It is a playing field, but use the concepts and influence the direction.
- Federal territory is usually hard to influence, but perhaps we have more influence this time.
- Only by monitoring this trajectory constantly.
- One of the many stakeholders in decision process.
- Suddenly a recreation island turns up in the plans and no argument against is listened to anymore.
- Geo-information can increase speed of policy making process, but especially improve the decision-making process.

I conclude that the quantity and the complexity and even temporal aspects regarding the information about a plan are seen as problematic. This may hamper the efforts to inform the relevant constituencies.
10. I have asked what communication was used to gain attention for their point of view.

**Figure 5: Media used to gain attention.**

It is interesting that two representatives sought court cases to promote their interests. The court is indeed used to gain attention for protected interests in a case like this. It also became clear that the Dutch use the method of petitioning very seldom. With the variable “media”, I intended to separate talk shows and press in media coverage from TV spots. The question regarding media and radio and TV overlap, however, and so should have been set up differently in the experiment.

11. 26% (4+1 = 5 out of 19) thought they would “perhaps” or “probably” end up in court.

**Figure 6: Estimates of ending up in court.**
Some of the remarks were as follows:

- As legal authority to defend our decision I will have to...
- We will go to Raad van State (State Council) for Natura 2000.
- Is not our role.
- Too expensive, use media instead, not court.
- Still many years and decisions to go first.
- Almere building outside the dikes and Pampus Island remain obstacles. (These islands are the source of some of the main conflicting issues during negotiations.)

The fact that only a minority considers court cases a good way to promote one’s views confirms our initial thought and starting point for developing a support system for co-regulation.

12. **Question 12: Results on Transparency**

For my research, it could be relevant to determine if there was a relation between transparency of decision making and co-regulation, on one hand, and appreciation of systems supporting information, on the other. I had only one respondent consistently argue a case against transparency. The results are still interesting background material for future research, so I have represented them in detail below.

I asked if the respondents thought transparency would slow down the decision making process.

*Over 70% (14 out of 19) thought it would not; 16% thought it would.*

**Figure 7: Transparency and speed of decision making.**

transparency will slow down decision making process
It is interesting to find a majority of real stakeholders who thought transparency does not impede the speed of the decision process. This is contradictory to the general belief that powerful decision makers prefer secrecy in their work and think transparency slows down the process.

I asked if transparency would help making a more balanced decision. Almost 90% (17 out of 19) thought so.

Figure 8. Would transparency support balance?

It is also interesting to see that a significant majority thought that transparency helped to achieve a more balanced decision. This would support the case for co-regulation quite well.

Figure 9: respondents at work filling the questionaires.
I asked if transparency would increase public support for the decision.

Eighteen out of 19 respondents thought the support would increase. This high score could provide a clue for the overall high preference for transparency. The stakeholders seemed to work towards a policy-making process that was broadly backed by the public. Further research could help to investigate how exactly the stakeholders perceived the costs of lack of support.

The final question referred to the notion the “experts” were better decision makers in the first stages than the public.

21% of the respondents thought that transparency became relevant after many experts had done their job; 74% thought this sequence was not necessary. Almost the whole population preferred transparency. One could question if this result was achieved because the respondents thought they should give a politically correct answer. Based on the remarks made with regard to other questions, I have no indication for such a bias, but this possibility was not investigated further during this experiment.
9.3.2. Post-demo: Second set of questions

Post-demo question 1)

Do you think to have less or more influence with this instrument on the decision-making process regarding your interests?

*In the pre-demo test 63% (12 out of 19) indicated that they thought they could influence the decision-making process. After the demo only 37% (7 out of 19) still thought the system would increase their influence and. 42% (8 out of 19) thought it would not.*

Some remarks were as follows:

- You depend on the users.
- You reach a broader audience that can vote.
- Static compared to personal contact.
- It is a medium that could be used.
- There is more at stake than space and formal documents.
- You can “sell” your ideas and visions better.
- Depends on how people would govern this instrument.
- Status discussion unclear: who participates in what.
- You can reach more people with this.
- Difficult to handle, depends on usability.
- Is extra means of communication.
- Discussion becomes more broad.
- Constraints are set.
- In this stage, government should choose and not invite more ideas.
- Interests become more visible and interconnectivity between aspects more clear.
- Powerful stakeholders will push trough.
- Transparency is also a must.

The picture that emerged from the remarks is quite nuanced. People seemed to like the idea behind the new support system, but warned for certain dangers and too high expectations. More than one actor indicated the relevance of the technological support at different stages of the policymaking process. They appreciated it as support for the process, but did not think it would increase their decision-making power.

Post demo question 2)

Do you find the instrument to represent your interests more clearly or less clearly to the outside world?

*63% (11+1 = 12 out of 19) thought the co-regulation system would represent their interests more clearly.*
Some of the remarks were as follows:

- For information provision.
- Depends heavily on the way the internet discussion works.
- If maintained and link to legal source is correct.
- Maps scale is too large.
- Extra means of communication.
- Has to be in “one-liners” anyway.
- Balancing interests is different from representing unequal choices as equal in a game.
- More insight.

The answers indicate that the support tool is considered to contribute to the communication process that each of the stakeholders organizes with the group it represents.

Post-demo question 3)

Do you find the instrument to be better equipped or less equipped to balance your interests against other interests in the decision-making process?

In the pre-demo questionnaire 63% (12 out of 19) thought their interests were already well balanced against other interests. After the demo 32% (6 out of 19) thought this balancing process improved with the co-regulation system and 32% thought this was irrelevant.
Some of the remarks were as follows:

- Does the decision maker look at this instrument? They only read what they want to read.
- Able to zoom in on location; know what is going on there, including my interests.
- Balancing also means valuing and prioritising, which is not given here.
- Only if authorities are obliged to provide their criteria for decision making.
- Splinter parties will get too much attention this way; size of constituency has to matter.
- Remains comparing apples with pears.
- Constraints are set, the instrument does not change that.
- The model depicts different interests better enabling better balancing.
- Powerful stakeholders will push through.
- There is a lot of participation going on, but the real prioritising is not made explicit.

This score of 32% is lower than expected. As with post-demo question 1, according to the remarks, there is a distinction made by the actors regarding specific stages in the policy making process that is a further nuance than the design stage of law versus the consolidated stage of law. Five of the remarks mentioned above indicate that the respondents differentiated between weighing and balancing against other interests as an explorative action by actors and balancing and weighing of interests during the actual decision-making stage. People seem to want more transparency in the stage in which the authorities or legislators do the final balancing, valuating, and prioritising. I did not differentiate such stages in the questionnaire as a variable, because the relevancy of staging in policy making itself was not the purpose of this research. Further analyses of this outcome revealed the aspect of this question in the questionnaire in relation to the viewpoint of the actor. I will elaborate later in this chapter.

Post-demo question 4)

Does the instrument provide you with a better overview on legal constraints or, in other words, does the instrument provide more clarity about which regulation applies where and what has to be changed for your objectives?
In the pre-demo test 74% indicated that they thought they had sufficient insight into the legal constraints regarding the case. After the demo 63% (12 out of 19) indicated that they thought the co-regulation system would improve their insights.

Some of the remarks were as follows:

- You do not have to search anymore, it is made readily available.
- What rule applies is more clear.
- Documents on ecological main structure do not provide more information on Natura 2000.
- It is about something else, in the end.
- Yes, if maintained.
- All information by location.
- You have to search less yourself.
- Background of legislation remains unclear anyway.

This result indicates that the system further improves insights in the complex issues that the stakeholders have to understand before deciding on their preferred legal design.

Post-demo question 5)

Is it easier with the instrument to depict the interconnections and complexity of the problem for the purpose of decision making?

In the pre-demo test 90% indicated that they thought the complexity of interests with respect to the case was well represented. After the demo 84% (16 out 19) thought that the co-regulation system would improve this aspect.
Some of the remarks were as follows:

- Much better overview.
- The more issues, the more complex.
- Overlapping plans? Careful with manipulation!
- I lack a reference in the system.
- Not from demo.
- Too much information to structure in picture.
- Crowding the map is not the same as complexity.
- Complexity is only enhanced this way.

The score on this question is quite a high score. Despite some critical remarks made by some participants, it seems the system was especially seen as a tool to convey complexity and pluriformity. This is also seen as an issue in pre-demo question 5.

Post-demo question 6)

Is it easier for you to keep track of other relevant discussions with this instrument? And the changes in those discussions?

Only 42% thought they could have an easy overview of all relevant discussions regarding the case in the pre-demo questionnaire. 95% (18 out of 19) thought this could be improved with the proposed co-regulation system. This is also an extremely high score.

Some of the remarks were as follows:

- If everything is maintained well!
- Looks like google maps with pictures.
- Risk of information overload.
- Danger of too much.
- I do not know, depends on the documents, The Ministry of Transport (RWS) already has more documents than they can handle themselves about the area.
- More insight by having overall picture.
This percentage not only supports the research claim of Experiment [III], it also confirms the notion of maintainability that was mentioned earlier as a necessary design aspect of any legal support system by the civil servants. The demand side in this survey confirmed the need for maintainability or sustainability. The overall relevance of the theme ‘maintainability’ was explicitly confirmed by the respondents.

Post-demo question 7)

Would it be easier to inform your constituency and interested parties about technical, economic, and ecological details of the line of argumentation concerning your objective? Does the instrument provide more insight into the details of your objective for those who are not involved on a daily basis, for example?

In the pre-demo test 58% indicated that they thought they already could inform their constituency sufficiently about the stakes in the case, while 37% thought this was extremely hard to accomplish. After the demo again 58% (11 out of 19) thought the system would help them to improve the information provision to their constituency. 32% (6 out of 19) thought it would not improve their ability to inform their constituency.

The remarks are again interesting:

- Calls for reactive action.
- Easy access for many people.
- Too complex for my constituency.
- Too much detail, too complex.
- Hard to handle.
- Can point people towards extra means of communication.
- Inform, but not convince.
- The private constituency of stakeholders would think it ridiculous.
The score indicates that the users believe the system could further improve information provision to their constituency. However the mixed comments indicate a need for further research. There seems to be a design issue which may transform a complexity problem into an issue of usability. This viewpoint is supported by earlier remarks made about the required experience for users. The remark about private use and ridiculousness is intriguing. The respondent defined the technology as a game in her response to question 12.

**Post-demo question 8)**

Would the legal service portal contribute to a well-managed decision process?

42% (8 out of 19) thought the portal would contribute to some extent, 6 out of 19 indicated they thought that it would contribute slightly and 16% thought it would not contribute much.

Some of the remarks were as follows:

- The decision makers are already well provided with information.
- More information available generates better balanced outcome.
- I doubt the intellectual level of decision makers, the system can be manipulated.
- Depends on the positioning in decision process, no reference for validating the criteria yet available.
- Only if authorities are obliged to react.
- You have to differentiate between choices and visions and information.
- Decision making is politics, not science.
- It remains people and politicians work.

These remarks again indicate a mixed attitude of positive inclinations with considerable warning signals. The remark about the need to separate decision and information had been made earlier. The issue of trust is clearly visible as well.
Post-demo question 9)

Are the demonstrated features the features you require for your support?

47% (9 out of 19) thought the legal service portal would provide the features that would actually support them in their tasks. 32% (6 out of 19) thought it would help slightly. Only one person (5%) thought the technology would not support at all. Two people did stated that they did not know and entered no answer at all. This has been classified as ‘irrelevant’ by me, since that category of ‘I do not know’ did not exist in the questionnaire.

Some of the remarks were as follows:

- Could be of added value.
- Need much more insight.
- Your own interpretation is the trap to watch out for.
- Some more integration would help.
- I miss pictures.
- Useful for me as policy advisor.
- I do not know.

This result indicates that the users are convinced that the system could actually support them. This is of course the result we hoped for.

Post-demo question 10)

was slightly different in its approach. The respondents were asked to answer a question about their views on the need for digital maps and the design process:

The government considers the usage of more digital maps supporting simulations and spatial design processes. Do digital maps help more than paper maps in your view?
Some of the remarks were as follows:

- Easy to access.
- Flexibility.
- If detailed enough.
- Depends on usability.
- Yes, because links to documents can't compare docs.
- Interoperability gets better.
- Digital maps are scalable and maintainable.

The preference for digital maps over paper maps is unequivocally clear. A significant majority spoke in favour of digital maps to support design.

Post-demo question 11)

Do you think that this instrument will contribute to the transparency of the decision-making process?

58% (11 out of 19) thought the system contributed to the transparency of the process. 16% (3 out of 19) thought it would not.
Some of the remarks made were as follows:

- What the decision makers do with it stays hidden.
- Danger of manipulation.
- No reference for validating, positioning in decision-making process.
- Yes! Information is more complete and easier to access.
- Depends on target group.
- Is not the instrument that decides the transparency but the integrity and expertise of government.
- Improves comprehensiveness regulations and deliberation.
- No, it increases misunderstandings.

The remarks indicate that there is considerable doubt regarding the integrity or the openness of authorities during the final valuation and decision-making process. Nevertheless a majority thought that the system would result in more transparency.

Post-demo question 12)

Do you expect to end up in court to defend your interest less quickly with these types of instruments?

The pre-demo test indicated that 26% (5 out of 19) already thought they would end up in court. After the demo 21% (4 out of 19) thought the chances for ending up in court would decrease with the instrument. 74% (14 out of 19) considered it irrelevant for them.

Some of the remarks made by respondents were as follows:

- You have faster and more comprehensive insight into conflicting interests
- You know in advance where it hurts, you are better prepared
- Can’t avoid having conflicting parties
- Not my job
- No, because people would continue discussions endlessly with this game.
The amount of positive answers regarding this question is 21%.

It is interesting to observe that the technology is defined as a game by one of the respondents. It is unclear whether other participants also share this conception and if so how that would impact their ideas about the impact on court cases. This may be addressed in future research.

9.4. Conclusion of qualitative test in experiment [III]

First the summary of the results will be examined:

- Question 2: Increased perceived ability to represent interests (58% + 5% = 63%)
- Question 3: Increased perceived ability to balance interests (32%)
- Question 4: Perception of better insight in legal constraints (61% + 6% = 67%)
- Question 5: Ease to convey legislative complexity (73% + 11% = 84%)
- Question 6: Ease to supervise relevant discussions (84% + 11% = 95%)
- Question 7: Ease to inform constituency (58%)
- Question 8: Relevant features for support (47% substantial + 35% slightly = 82%)
- Question 10: Appreciation of digital GIS over paper map (100%)
- Question 11: Contribution significantly to Transparency (58%)

Examining the decision/implementation/enforcement stage results in the following:

- Question 1: Increased perceived influence on decision (37%)
- Question 8: Contribution to better decision process (42% + 32% = 74%)
- Question 12: Increased chances to stay out of court (21%)
The research question is answered positively if I could substantiate the viability of the solution in a situation with high conflicts of interests. Although there were definitely many comments referring to this issue, the overall impression is that the respondents were positively inclined if certain conditions were met.

A number of observations can be made regarding this research question: (or . ?)

Further analyses question 3)

The counter-intuitive result of 32% positive response on the question about balancing of interests requires some further thought. The remarks indicate that the respondents differentiated between weighing and balancing against other interests as an explorative action by actors and balancing and weighing of interests during the actual decision-making stage. People seemed to want more transparency in the stage in which the authorities or legislators did the final balancing. The exact question was: ‘Do you find the instrument to be better equipped or less equipped to balance your interests against other interests in the decision-making process?’ I did not put emphasis on the difference between the role of the technology regarding interest balancing during the policymaking stage ‘exploration’ and the role of the technology regarding interest balancing during the stage: ‘decision’ in this survey question at the time of this test. At the time the differentiation between finding consolidated law as in experiment [II] and the legal design process in experiment [III] without further nuance seemed appropriate. These findings are in line with the findings of two other researchers. Carver dis find similar results in his research about GIS based decision making: ‘GIS-based decision tools need to be exploratory rather than definitive’. (Carver, 2001, in Micheal Mcall, 2005). Nuojua found something similar in later research: GIS supporting ‘conceptual stages of planning in which mainly sketches are produced’ (Nuojua 2009).

Further analyses points at another aspect regarding the exact phrasing of the question in relation to the expected results.

The research expectation was, that the respondents would reply with a positive answer, thereby indicating that the perception of the respondents about the role of technology follows Habermas, Cavers and Oosterhout’s theory that, if it can be made visible that the other actor is taking into consideration your plans of action, this ‘explorative’ and ‘responsible’ behaviour would increase the legitimacy of the thus constructed policies plans and regulations. The difficulty arises in the viewpoint of the actor implicated by the question: a viewpoint concerning defending the individual interests of the actor in relation to the decision outcome versus a viewpoint from the respondent about the potential of technology for all actors in the decision process.

To obtain an answer from the helicopter perspective from the individual respondent, I could have phrased the question differently. It could have been:
Do you think that the interests of the actors are better balanced or less well balanced if this instrument is being used in the decision making process.

To obtain an answer from the individual perspective, but still as part of a perspective on the overall legitimising process, the question could have been:

Would it help you to accept the outcome of the decision process, if the instrument enables you to visualise how other actors balance their interests against your interests?

The different phrasing of the question concerns the subtle difference in viewpoint: does the question address the respondent as an actor who defends his own interests in the design process or does the question address the respondent as an actor looking from a helicopter perspective who is observing the process as a whole for all actors involved. A respondent can perceive a causal relation between the technology provided and his chances of defending his own interests as irrelevant for the final outcome of the decision, while still maintaining a positive perception of the potential of the technology provided for the legitimacy of the decision process as a whole.

The research results and especially the remarks made by the respondents confirm also the observations of other researchers that the criteria for the actual decision can become the focus of the decision (Sheffield, 2007). The remarks indicate either the wish to have the criteria ‘out in the open’ or the assumption that the ‘real decision’ is already fixed because of fixed constraints or a certain ‘them’, that have already made a prioritisation.

I doubt this ‘opening up’ of the criteria’ is feasible because of several reasons:

- The assumption of this ‘call for more transparency’ is that those criteria are known and fixed beforehand, whereas – in practice – these criteria are the result of the whole process.
- If the criteria were set beforehand, those criteria would not have been inclusive of the plans of action of the participants.
- If there had been a ‘them’, with an agenda, this group has not been explained to me as a researcher. Such an agenda would have influenced the whole setting. I have to assume there was no ‘them’, although one can also safely assume that there are influencers with less power and influencers with more power in any design process.

The expression of doubts by the respondents - which caused a low result on this particular question – do unveil a factor that plays an important role in the potential contribution of technology to legitimacy. If the participants of the policy design process or (plan design process) perceive the result as already fixed, there is little room for improved legitimacy. This factor is voiced by many researchers in different contexts (ref).
Further results

- The participants were already positive about the existing process. Still, they found the system a positive improvement on that protocol. A refinement between explorative action, alternative seeking, and negotiation could be helpful in further research.
- The low score on the balancing of interests unveils another nuance in the actions that could support co-creation and legitimacy of the outcome; the affordance of the “seeking area” refers to the notion of seeking alternative spatial locations for a plan at greater or lesser proximity to other plans and interests. This can be defined as “intrusion minimisation”, “non-invasiveness”, or “considerateness” in contrast to other types of interest balancing like “opportunity finding” or “visualisation of negotiation space”. In spatial law, the notion of proximity has significant meaning, as demonstrated in Chapter [III]. The interests of the actors can be more or less affected by the exact approximation of activities from other actors, like placing of windmills, permission of housing, or the set-up of new infrastructure. The approach based on the ideas of co-regulation and Habermas required technology that would enable the actors to take the interests and the plans of others into consideration. The technology with the cursor-attached plan was designed for this purpose, as it was defined by the moderators. The specific question about the contribution of the interest balancing technology in the survey did not cover such a nuance, however. Future research could benefit from including a combination of staging and different types of balancing interests. The consideration of these issues at the time of this experiment was not yet addressed widely in academic research regarding eParticipation. Consideration became a part of eParticipation research later, as was demonstrated by the work of Bench-Capon et al. on Parminedes (Wymer, 2012). I will come back to this issue in Chapter [X].
- The participants thought that the legal complexity was already well displayed. Still, improvement by this technical approach was readily acknowledged (84%).
- This is also true for the legal information provision where 67% thought the system an improvement.
- Other strong statements were made regarding the system providing an overview of all other relevant discussions about the case IJmeer (95%), the supportive charter of the tool’s functions (88%), and contributions to a better decision-making process (77%).
- 100% of the population preferred digital GIS over paper support of policy design processes.
- If 21% of the participants thought chances to end up in court decreases when one would use the system as demonstrated, the societal benefits could be considerable.
- The notion of maintainability was confirmed, this time from the demand side.
- Transparency and a wider decision-making base was preferred over the alternative expert approach.

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145 Term as suggested by K. Koehein to put more emphasis on the responsible nature of such an act of a citizen toward another citizen.
I may, therefore, conclude that the research questions were answered in a positive sense. The question:

Is this design of a legal service portal for co-regulation seen as supportive by the actors in the context of real world conflict of interests (NIMBY)?

Can clearly be answered positively.

This outcome is supported by other scarce empirical field research, like that of Nuonjua and Kuutti in 2008:

‘In the aspect of the urban planning knowledge creation, Web Mapping technology managed to support the externalization of local knowledge in some extent. WMM was a dynamic medium: discussion about the places was active usually for a few days after the marker was placed on the map. The study strengthens the general conception that the threat of a change in their immediate surroundings activates people. NIMBY (Not In My Backyard) phenomenon clearly came up as a more active discussion about the places already under development such as E75 highway junction area and the market place of the town centre.’

Critical notes regarding the outcome are as follows:

- The conclusion of Experiment [III] is based on one relevant experiment with 20 relevant stakeholders. Still, it should be acknowledged that such a substantiation may not be entirely sufficient for far reaching and generalised conclusions. However it gives enough confirmation that co-regulations helps and technology enables co-regulation. In what situations and to what extent it does so is matter for further research. Given the stakes involved such research requires cautious methods and extremely careful preparations, taking years of planning.

- I have found no theoretical basis for a clear metrics for increased or decreased legitimacy that could be used for hard measurement against legal service infrastructure functionalities and criteria for improved discourse. This created some problems when scores of respondents had to be validated. The introduction of the stage model and “legitimacy costs” was helpful, but it requires much further research. Perhaps exact metrics is exactly what Habermas (1985) did not want when he developed his social constructivist theories about legitimacy in contrast to Weber’s more ‘objective’ rational views. In his view, the essence of legitimacy was about the process of achieving mutual understanding.

- Participants agreed that the system provided more transparency and information, but they distinguished between the exploration stage and decision stage. This was not well supported in the questionnaire, so some questions, like the low score on weighing interests against other interests, require more differentiation.
The questions in the questionnaire were not precise enough to conclude that the ‘mouse moving’ of alternatives in the real SimCity sense was seen as a crucial affordance. I can only conclude it was part of an entire package of explorative and constraint satisfaction functionality that was positively received.

There is a difference between an individual defending his own interests and the individual looking from a helicopter perspective looking at the whole process. Questionnaires regarding the legitimacy should distinguish clearly between those points of view.

9.4.1. Additional findings during Experiment [III]

The living lab approach of Experiment [III] had a number of additional results that occurred during design and set-up discussions:

- The aspects of trust were confirmed.
- The need for transparency of the process was confirmed.
- The need to pay more attention to the position and actions of the system bureaucrat was confirmed.
- The tendency to dispute the decision making criteria was confirmed.
- The tendency to assume a hidden coalition and a fixed outcome was confirmed.

9.5. Post-test triangulation and validation:

What happened in Flevoland?

In Chapter [VII], part of the validation process in Experiment [III] was described. The validation method was defined as a mix between pre-design, qualitative tests, and uptake. Pre-test validation can be found in agreement on technological designs, the willingness to risk using the technology in real policymaking situations, and agreement on legal content management interpretation. Pre-test technical validation was established by performing feasibility tests. A qualitative test among a focus group of relevant actors has been given in this Chapter. Post-test validation was in the follow up activities of the actors and their peer groups to implement the technology after the proof-of-concept. The peer group is relevant since the experts involved may become so engrossed in the design process that they grow biased “about their baby”. Colson (2012) stated that describing the audiences is a vital part of a case study approach (p. 241, p. 158). Another part of the validation is the: ‘Triangulation of the results with documents and the quantitative piloting test’; (Guion, Diehl, & McDonald, 2011). Validation is therefore also in the audit trail of meetings, email, designs, models, and working software applications. Perhaps the most important part of the validation is in the uptake of the chosen technology. In short, would the co-regulation mechanism actually be implemented in the Flevoland working processes?
About the Flevoland developments after the 2009 qualitative test

A number of things happened after the test described above:

- The Flevoland team was energised to support all types of co-regulation since the platform helped to push the Province into its next stage of development. Three months after the survey in 2009, the National parliament decided to “freeze” all plans. This resulted in huge disappointments on the team. In 2011, the new government promised not to kill all Natura 2000 related ambitions.

- In 2013, the government and a National Funding Agency together invested 45 million Euro to make the estuaries possible in 2015 the Marker Wadden became a reality. Wadden are islands in Dutch language.

- The technical team was extremely enthusiastic about Legal Atlas. They decided to incorporate some of the ideas about ontologies and legal retrieval into the 2006 Regional Spatial Plan and future legislation (see illustrations below).

- In 2012, the Regional council decided to abolish the concept of cyclic planning in printed legal sources altogether. The ‘Omgevingsplan’ was abandoned as a legal source and concurrent digital versioning became the new juridical process. This was made possible because of semantic mapping technologies as described.

“Behalve een gedrukte papieren versie van het Omgevingsplan is er ook digitaal raadpleegbare versie, deze is volledig interactief! De teksten en de verschillende kaarten van het Omgevingsplan zijn digitaal aan elkaar gekoppeld. Daarbij zijn diverse zoekmogelijkheden. Zo kunt u bijvoorbeeld via een trefwoord plantekest en kaarten zoeken. Ook kunt u door op de kaart te klikken naar een plantekst zoeken. Na iedere zoekactie worden de gevonden paragrafen en kaarten getoond” (text on the website of the digital Spatial Plan of Flevoland). This translates as “in addition to the paper version of the Spatial Plan, there is now a digital readable version as well. The legal source texts have been linked to the different maps of the Spatial Plan digitally. One has several searching options. One can retrieve sources and maps using key words. For example, one can also find legal source text by clicking on the parts of the maps. The relevant maps and texts are shown after each search activity.”

The new National Ministry of infrastructure and environment had stated that IJmeer/Markermeer would receive little support for their plans. In February 2012, Markermeer received 15 million Euros to invest in the estuary. In January 2013, Sharon Dijksma, Minister of the Dutch Ministry of Environmental Affairs and Infrastructure, allocated an additional 30 million to the ‘Marker Wadden programme’. The article stated that “Provinces involved, the recreational sector and environmental NGOs have long since reached an agreement about the best approach to solve the problems in the area”. The project called ‘Marker Wadden’ has to put an end to the deteriorating state of the environment (Volkskrant, January 18th 2013).


Figure 10. The new legal production system of Flevoland made by Tercera.

Figure 11: Illustration of map to text retrieval of relevant legal texts. The new 2011 legal production system that is partly based on Legal Atlas concepts of retrieval. The pop-up on the left side indicates a “searching area” for new urban development on the water.

Text-to-map technology has been named in Chapter [II] and [III] as the technology that would be of the most value for the business manager. In figure 12 this functionality is demonstrated. When a person selects a specific area on a digital spatial plan of Flevoland one retrieves the relevant term from the spatial ontology in the application that was based on IMRO.
Figure 12: detailed digital map area in Flevoland.

The figure then displays a detailed digital map-area in Flevoland (Dronten) in 2010. The mouse is located on an area. After clicking it retrieves ‘sport’. The relevant legal text appears. Retrieval of the opposite: text-to-map (from request of a business manager to relevant locations) is also made possible using the term ‘sport’. In the figure below the same querying technology or legal retrieval technology is used as a demonstrator at Geonovum to show its significance at a National level for the new Dutch program for ‘the omgevingsvergunning’ in 2015. I will elaborate on this programme in Chapter [XI].

“2012: Manja verHorst van Leeuwen received the Royal decoration for her effort to protect open space and her dedication to preserve Markermeer against attempts to build 60,000 houses ‘beyond the dikes’. She represented ‘De Kwade Zwaan’, a successful legalistic pressure group.

2015: The Markerwadden, the estuarium that resulted from the deliberation process, is actually being build. Please see the movie at https://www.natuurmonumenten.nl/marker-wadden/english
Figure 2: Demonstration of text to map legal search query at geonovum (Tercera, 2015).

Figure 3: Thematic classification of rules and regulations in Flevoland, 2015.
The categorization as shown in the figure above shows the uptake of the idea of use case scenario’s supported by an overall classification of policies in themes (see specifically the blue icons) as it was used in its predecessor prototype during the experiment [III] in 2006 for the conflict matrix. This is again a substantiation of the uptake of the technology.

*The Regional Council member (Marc Witteman) twittered ‘to visualise our policy intentions is important for the development of additional support!’ after his visit to us.*

The broader research impact of the entire research is presented in Chapter [XI], but this exceeds the purpose of Living lab validation of the experiment [III] itself. Overall, I conclude that the mixed strategy with a range of validations as part of Experiment [III] were positive; the design phase, the feasibility test, the focus group feedback, and the implementation of the technology by the legislator all support the notion that this agile design of co-regulation technology supports the tasks and challenges that moderators, actors, and legislators face during policymaking phases.

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Overall conclusions and reflection

- Problem of legitimation of legal system
- Theory: does technology help?
- Maps Experiment I
- Legal service infrastructure
- Formal map test Experiment II
- Theory on Co-regulation
- Co-regulation Experiment III
- Technologies for Co-regulation
- Living Lab + Case study
- Future research and recommendations
- Conclusions
The thesis addressed the problems of the citizen who’s behavior impacted by law and who wishes to act lawfully, or at least should be able to understand if and where his behavior is in conflict with the law. To illustrate this I introduced the case of a business man that wants to pursue a business activity and who consequently is confronted with many rules. The main driver for the research at the start was the notion that the legal system as an institute requires support by a substantial number of citizens in order to achieve legitimacy. Otherwise, citizens will lose their will to behave co-operatively. This would in turn lead, for example, to increased law enforcement efforts for the government in endless cycles of action and reaction. Modern governments consider ICT as an important mechanisms to create support, and so the question becomes if this is true and how such digital solutions should be designed in order to being perceived as useful. I have argued that inadequate legal services will lead to decreased support for the legal system and consequently undermine the legitimacy of that system.

Main research claim as stated in Chapter [I]:

I have explored if a better design of the government legal service infrastructure can support legitimation of Law in the sense of ‘Le Contrat Social’ between the citizen and government and I claimed that the position defended by Marcuse et al. — that information technology in the hands of government is always an instrument for manipulation and depersonalised bureaucracies — is false. I used three experiments to build evidence for this assumption These experiments were presented in this thesis.

The design challenge that I have explored is:

Can 1) improved access to and 2) more user-centred case assessment and case handling as well as 3) the increased participation in the development of regulations — support the legitimacy of the legal system between government and the citizen.

The first section of the thesis provided an analysis of the historical and theoretical fundaments and the design factors that could be used to explore the gap and the technological means to support the ‘user of law’. After an investigation of several approaches, the research focused on case assessment and knowability of business managers in a spatial context. Digital geo-mapping technology was chosen to support the user. The first design questions for the business manager were formulated to start the design process. The case assessment question from a business perspective was concentrated on: ‘Is this allowed here?’ The early findings of the application of that technology were promising, but they also comprised a
range of additional concerns and challenges. Amongst these concerns were the lack of a service orientation on law (opportunity and alternatives finding after the computer says “not here”!) and the huge problem of consistent maintenance of legal content. Government should provide a service that enables case assessment, opportunity finding and the planning of activities. If the case assessment turns out to be negative because of certain constraints, a more citizen centered government approach would support the legal service of finding other opportunities where the alternative location meets with less legal problems for that specific activity. The design of such a service became an additional research question. This new question was again translated into a design question. How could technology help governments to provide such a legal service. Such a service should help users to find answers to legal-planning related questions: If it is not allowed here, where is it allowed? We intended to support this legal effect-planning question by building an automated map-based system, implying a different work practice from the current one. We also posed ourselves a usability question: *Do the actors prefer Map-technology over paper?* The design question generated additional issues of introducing well-known architecture principles for digital infrastructures in a domain where such a term had not been used much before. We also brought to the attention the fact that legislation is the result of a policy production cycle. Providers of these services are usually legislative agencies such as a Province that require a cost effective legal content maintenance system. Otherwise the cost of these services would be extremely high and as a consequence the designed services would remain theory as they couldn’t be actually used in practice. It was made clear that in order to realize such services, input from various disciplines was required. We were required to combine all these angles in order to calculate the effects on the maneuvering space of the business manager.

This research led to the following sub-questions:

- What kind of technology provides legal effect planning?
- What kind of architecture supports legal content maintenance and consistency?
- What factors can improve legitimacy of design by the system bureaucrat?

During interviews with legislators it became clear that many types of spatial legislation are in fact a steering mechanism to balance societal interests. In the policy-making process leading to new regulations, interests of individual stakeholders have to be mitigated into an acceptable middle way. The legal consolidation in the view of the legislator is the ‘freeze’ of this balancing process. Important stakeholders and regional legislators think this freeze could be improved if the balancing process becomes more interactive. The design question becomes an investigation into co-regulation and ‘prosumership’ in law (see Chapter [VI]). Could legitimacy of law be improved if technology was used to enable co-regulation? Could technology support ‘harmonization of plans of action’ and ‘common situation definition’ as stipulated by Habermas? The third phase turned into an investigation in the different aspects of an interactive approach to design. Could it be built? What are the pitfalls? Which technology is required, exactly? What would those actors think about it? The latter was not a simple design question. Who are ‘those actors’ and what do you mean with ‘think about
it’and what is ‘it’ anyway. In the third section, a Living Lab research approach was adopted, borrowing such methods from Lewin’s action research of social sciences and more recent from ICT-design methods like ‘Agile’ and ‘Scrum’ (Sutherland, 2004). Chapter [VII] gave an in-depth description of the use case scenario (IJmeer/Markermeer), the actors involved and the issues. This has led to the following sub-questions related to co-regulation:

- ‘What kind of service portal based on architecture and supporting the process of co-regulation should we design’?
- ‘Do actors in a NIMBY situation prefer such a portal over paper based policy design?’
  ‘Would such a portal for co-regulation improve the process in such a way that fewer actors would end up in court?’

In Chapter [VI] several relevant themes were addressed, like trust in deliberation platforms, the risks of regional moderators and digitalization of policies involved. It took some years to prepare the right use case with the right people at the right time to test a technological service infrastructure for co-regulation.

10.1. Research operationalisation

The operationalisation of what Habermas calls the gap between the life world (Lebenswelt) and the institutionalised world as described in Chapter [II] is meaningful in the context of this research. The operationalisation allows for the step from abstract concepts to concrete design experiments.

The connection between the experiments in this dissertation and citizen’s experience of bewilderment has been made by choosing the use case of the replacement of all Dutch gas stations in Experiment [I], by the use case of a range of businesses seeking opportunities in Experiment [II] and a large investment project in a sensitive area, the IJmeer/Markermeer as use case in Experiment [III]. The contribution of technology to legitimacy is operationalised as improved access and case assessment, improved service perspective and opportunity finding, improved legal effect planning and contributions to ‘common situation definition’ and the perceived ‘increase in the ability to harmonize plans of action’. “The action of the agents involved are coordinated not through egocentric calculations of success but through acts of reaching understanding. In communicative action participants are not primarily oriented to their own successes. They pursue their individual goals under condition that they harmonize their plans of action on the basis of common situation definitions”. (Habermas, 1984 p. 286).

The assumption is that increased accessibility, increased services for legal effect planning and increased consideration and negotiation capabilities can lessen 1) business lost in a labyrinth of law, 2) inconsistencies that leave government officials in a state of shame because they have no update of the latest spatial plans themselves and 3) perceived black-and-white mani-pulation of the decision processes (see the Korenwolf example Chapter [II]).
10.2. Findings of three technology design experiments

The aim of the technology design experiments has been to test the effect of specific ICT designs, henceforth technology, on the stakeholders in (legal) decision making processes. These experiments were described in detail in chapters [III], [V] and [IX].

10.2.1. Findings experiment [I]: Knowability

The business use cases owners (LPG station replacement, recreational versus permanent housing, event organiser) thought a permanent and map-based legal service would be beneficial. The visualisation of legal constraints (opportunity finding) in map layers and “greyng out” negated area’s were appreciated as case assessment support by business managers;

Increased knowability (context, map layers, navigation and filtering was highly appreciated. The potential and feasibility of retrieval of “what-can-I-do-here?” had been convincingly demonstrated and helped with case assessment.

Figure 1: knowability: case assessment support.

The technological support for legal case assessment worked in principle as shown in page <> in Chapter [III]. Users and experts in this experiment have a preference for the affordance of a ‘map interface’ over ‘text based interface’. The map also provided an overview of legal sources at a regional level that a city’s website of that time did not. Up until that
moment, there was no website that could provide the business manager with an overview, since provincial portals provided provincial information and local websites provided local regulations. The research also showed that an improved opportunity finding legal service – where-can-I-do-this? – was required. Content-maintenance costs was stated as a potential inhibitor for legal case assessment based on legal source documents: the latter have to be complete and up to date. To maintain the consistency requires substantial effort. A consistent, maintainable and cost effective infrastructure is required.

10.2.2. Findings experiment [II]: a service for legal effect planning

The first part of experiment [II] (Chapter [V]) dealt with feasibility questions regarding technical support for client centred legal service design:

- Can such a text-to-map architecture be based on proper standards?
- Is a legal service infrastructure feasible and maintainable?

Figure 2: feasibility study of text-to-map: legal atlas.

These feasibility questions were answered positively and demonstrated by building and testing a proof-of-concept. It was possible to build a legal service infrastructure that offered retrieval of opportunities (locations) that matched the needs of business managers. Maintainability of legal content for legislators was made possible by applying the right architecture principles for a service infrastructure: a digital infrastructure enabling consistent, maintainable and cost effective legal effect planning is feasible.

The next step in experiment [II] was to test the proof-of-concept with a new group of respondents, where the issue of repeatability of the experiment and its methodology played a more central role.
The design question was summarised as:

**Could a digital map system support (afford) navigation of legal constraints more effectively than a traditional system using mainly texts?**

The findings were:

- The actors do prefer a digital map-based system over a traditional text-based system and the affordance of Text-to-Map.
- No proof was found that a digital map-based system helps the user to be faster or more accurate in the learning time provided (nor the opposite could be confirmed).

The objective measurements, using the SUMI methods and numerical measurement, did not support the claim about text-to-map over map-to-text. I concluded in that chapter that there was a preference, but no objective support for that preference based on my operationalization and that there could be a learning effect involved. Some respondents expressed a tendency to treat the digital system process as a copy of a paper system process in the short time we gave them. This could indicate that people need to get acquainted with the possibilities of a digital system. Such a conclusion would require a different research setting with much longer observation periods, however. It might also require a longitudinal test would include usability aspects and user satisfaction, but such test would be extremely hard to perform with actual users in an actual user-context. It must be stressed that the entire enterprise depended on voluntary cooperation of real users and experts, and I’m very grateful that the many people involved in my experiments were so cooperative to dedicate their time to me!

### 10.2.3. Issues leading to the next steps

The legislators and influential NGO’s involved in the series of experiments described in this thesis had expressed that the most relevant contribution to issues of legitimacy of law would probably be found in the area of “conceptual stages”, so this became my focus in the next experiment about co-regulation. In that part of my research I started to investigate opportunity finding, exploration and sketching as part of interest balancing and policymaking. These activities are - like knowability and service - close to the terms and intentions mentioned by Habermas. This part of my research can be found in section 3 of this dissertation.

### 10.4. Findings Experiment [III], co-regulation

In Chapter [VI], I discussed some of the relevant theories on Co-production, technology and trust. This helped to define the characteristics for a relevant use case in a relevant environment of decision makers, high interests and relevant NIMBY problems.
in Chapter [VII]. The popular term NIMBY was used to illustrate the societal relevance of the legitimacy issue. In Chapter [VII], I decided to follow a living lab approach for the collaborative design of the technical solution and the research. Chapter [VIII] depicted the embedding of the technology in the Flevoland environment. This was again a substantiation of feasibility of the infrastructure as described in Chapter [V]. Some of those aspects had to do with the needs of moderators of co-regulation. Some of those aspects had to do with the affordance of a ‘seeking area’. The technology was tested in Chapter [VIII] for the following aspects:

- **Text to map (legal access and case assessment)**
- **Map to Text (constraint analyses and opportunity finding)**
- **Legal reasoning**
- **Attributed cursor (co-regulation and interest balancing)**
- **Moderation of communities of actors**
- **Consistent and maintainable legal content ordering**

**Research Claim: at least six types of legal services are feasible to support a co-regulation portal (see chapter [VIII]).**

1. Moderator support
2. Content management
3. Knowability
4. Opportunity finding
5. Modelling support between policies, norms and the system parameters,
6. Consideration and Negotiation support.
The feasibility had been made plausible during the technical and organisational testing in Flevoland.

In general a number of earlier findings were confirmed by the living lab:

- The importance of the relation between trust and the use of technologies was confirmed.
- The need for transparency of the process was confirmed.
- The need to pay more attention to the position and actions of the system bureaucrat was confirmed.
- The need for further integration of eParticipation or co-creation and the ‘normal’ legislative production process of the regional authority was confirmed.

10.4.1. Findings of Experiment [III] stakeholder test

In Chapter [IX], I start with a description of the user group, the key indicators and the experiment protocol, including a definition of “conflicting interests”. A lay out of the test and the circumstances was given next. The member of the user group were stakeholders in a decision-making process regarding the build and deployment of 60,000 houses plus infrastructure in the Natura 2000 protected IJmeer/Markermeer.

The research question was:

Is the legal service portal design for co-regulation perceived as supportive by the stake-holders in the context of balancing a real world conflict of interests (NIMBY-situation)?

In order to find answers to this question I developed a survey that resulted in the following findings:

- The participants thought that the legal complexity was already well displayed. Still improvement by this technical approach was readily acknowledged (84%).
- This is also true for the legal information provision where 67% thought the system an improvement.
- Other strong statements were made regarding the system providing an overview of all other relevant discussion about the case IJmeer (95%), the supportive charter of the tool’s functions (88%) and contributions to a better decision making process (77%).
- 21% of the participants think chances to end up in court are less using the system as demonstrated. The societal benefits of such a number could be considerable.
- The notion of maintainability was confirmed, this time from the demand side.
- Transparency and a wider decision making base is preferred over the alternative expert approach.
- There was unanimous (100%) support for digital GIS over paper based processes to support the co-creation process.
Investigating the communicative act of ‘consideration’

Actors who search for space for their plans within that seeking area are enabled to digitally explore the extent to which other plans are in conflict with their plans (see fig x). I concluded that explorative and informative information together created the constraint satisfaction functionality (affordance) that was received positively. Overall the technology was well received as part of an overall process where law is not yet consolidated.

Based on this research, the following aspects of interest balancing as part of co-regulation can be improved with digital (map) technology to support legitimacy as a whole:

- Opportunity finding against existing legal constraints
- Exploring the opportunities and constraints
- Taking into Consideration the plans of action of others
- Visualisation of negotiations space like ‘seeking area’s’
- Visualisation of prioritization

There is evidence that actors prefer support during the explorative stage rather than the decision stage. A stage model for contributions of technology to legitimacy seems relevant and requires more research.

The evidence that would have supported the contributions of the technology used to the decision making process as part of interest balancing was smaller than expected. Further analyses showed that the exact phrasing of the question in relation to the viewpoint of the actor could clarify this result. The different phrasing of the question concerns the subtle difference in viewpoint: does the question address the respondent as an actor who defends his own interests in the design process or does the question address the respondent as an actor looking from a helicopter perspective who is observing the process as a whole for all actors involved. A respondent can perceive a causal relation between the technology provided and his chances of defending his own interests as irrelevant for the final outcome of the decision, while still maintaining a positive perception of the potential of the technology provided for the legitimacy of the decision process as a whole. This difference could have impact on future research from a methodological point of view. One should be aware of the various differences in viewpoint and the fact that institutional theories (Oosterhout) that are derived from a helicopter perspective should be operationalised into questionnaires with this perspective in mind.

Based on the evidence of experiment [III], it can further be argued from this research that without design transparency the technology would be subject to the position taken by Marcuse and Chomsky; that technology is an instrument for manipulation.

The living lab approach of experiment [III] did result in a number of additional results that I observed during design and set-up discussions.
10.4.2. Other results experiment [I and II and III]:

- Digital maps seem an appropriate technology for support in this domain, although objective substantiation in line with the preference still has to be provided.
- Maps and other visualisations are (still) regarded as very unusual means in the juridical world of text.
- Client oriented services such as ‘where-can-I-do-this’ is appreciated.
- Technical platforms and standards are developing rapidly to the level where the first ideas of this dissertation 10 years ago are now becoming common sense (I will elaborate in the next chapter in great detail).

10.5. Overall conclusions Experiment I, II and III

I have conducted three experiments with three user groups. The findings of these experiments were summarised in the paragraphs above. I will now proceed by drawing some overall conclusions.

I set out to discover if technology could support legitimacy of law.

Overall the conclusion can be that the answer is “yes, it can”. There is little evidence that it does not.

I claim that a better design of the legal service infrastructure can support legitimation of Law in the sense of ‘Le Contrat Social’ between the citizen and government and that the position defended by Marcuse and others – that information technology in the hands of government creates depersonalised bureaucracies and is merely an instrument for manipulation – is false.
10.6. Critical reflection

In this part of the chapter I will reflect on the conclusions regarding the research about legitimacy, technology and law.

Regarding legitimacy as the object of research

The main research question regarding technology and legitimacy is clearly a difficult question because of the broad scope of these terms. The question was inspired by the bewilderment as expressed by the LPG station owner because the lack of government service after he was ordained to leave the current location. I realised – as the responsible project manager for its building – that www.overheid.nl was not going to help this person. In retrospect one should contemplate the broadness of such a scope, however. Would it be advisable that another researcher would start from the same high level perspective? Could one not better have stayed with simpler terms such as user satisfaction?

The disadvantages of the approach using such broad terms are many:

- The comprehensive research would take several lifetimes;
- The focus can easily get lost and side-tracked;
- It can become unclear if the research is about technical solutions or about legitimacy or about government service designs;

The advantage of the use of broad terms such as legitimacy and technology has been that the overall perspective remained at the appropriate level of abstraction. It helped to explore the three elements that combined into a legal service concept: 1) Technology (in this study focussing on digital versus paper-based technology 2) Norms (in this study focussing on spatial regulations and 3) User needs (in this case a set of use cases in the spatial domain). The terms used did contribute to a lengthy effort in exploring and describing the ‘field’ of legitimacy, trust, transparency and technology and its relation with Law. The terms did also provide an anchor to the scope creep and explorative wanderings because the origin of this research started with the use case and its significance for many citizens that face the labyrinth of law. One could also approach the problem using behaviour analyses in an experiment regarding the user perception of increased or decreased legitimacy while adding technology. This would require a better understanding of the metrics of legitimacy, however. I will elaborate on ‘measuring improved legitimacy’ in the next chapter.

Legitimacy for whom? About the actors:

I have not measured citizen’s perception about legitimacy in general, nor have I measured increase or decrease of ‘alienation’. I have operationalized legitimacy in sub-questions, such as the ability of co-regulation in experiment [III]. The actors in experiment
[III] did express that they a) could present their interests to the outside world much more clearly, b) could explain the complexity of problems much more clearly and c) could provide an overview of relevant discussions on the topic much more clearly by using the technology in the test (see Chapter [IX], questions 2,5 and 6). The assumption is that there is a relationship between the perception of these key-actors in a representative case about a balanced policy making process resulting in well balanced regulations and the perception of their constituency on well balanced regulations, but that relationship about their constituency requires more research.

During the studies preliminary to this PhD-thesis research, I investigated who the actors were, that could be helped by improved technology or design. After several visits to city councils it turned out that the Dutch population seldom ventures into a legal debate by themselves. In the practice of four city councils the appeal cases were always performed by representatives, by legal specialists.

As a consequence, most of the interviewing in the three experiments were done with representatives rather than with citizens, such as the post-hoc interviewing of the NGO’s involved in the IJmeer/Markermeer. The question is in how far my research which results are derived from the participative representatives rather than individual citizens actually addresses Legitimacy of law. For my research I furthermore have to limit that claim to the Netherlands, a country in which working with representatives is common practice and in most cases undisputed. In other countries the situation may be different.

Another question is the significance of the results for legitimacy of law. The method applied here is post-hoc perception research. I intended to make it plausible that technological support would improve perceived legitimacy of law. Such a claim would be stronger if there had been a defined starting situation and a longitudinal comparison with two groups of actors in the experimental set up. In the next chapter I will suggest to apply such an approach to the development of the new ‘omgevingswet’ in the Netherlands.

Technology as a potential threat to legitimacy

It became clear during the investigations that technology is not always supportive of legitimacy. The instances where technology could be a threat rather than a support of legitimacy did not seem to be related to manipulation of citizens by government as posed by some theorists or even to the alienation as I described in the context of the LPG station owner, but rather to the complexity of the service design process itself.

One of the findings in the research is the concern of the producers of law (legislators) about the increased complexity of the design process. These concerns illustrate the challenge for future digital (legal) services. Whereas the government officers in the Arnhem case described in the first Chapter expressed their worries about the glue that came off from the 2008 paper plans, thereby making it impossible to follow the consideration regarding that plan, the 2015 officer is worried about the traceability of those considerations in digital
systems. None of these officers would contemplate going back to paper, however. The threat is not in the technology, but in the lack of proper design methods for complex government processes that affect large amounts of citizen-government transactions.

The changing role of Transparency during the research period

The role of transparency as a condition for legitimacy also changed during the course of my research. Transparency in eGovernment is probably a ‘dissatisfier’ (Grimmelikhuijsen), but that does not make it less relevant. During the time of my research, the role of technology in society changed. There are new transparency challenges emerging that are different from earlier reasons that had more to do with content accessibility. New reasons are related to the design of complex systems and because of the role of the system bureaucrat in the design stage. The design and deployment of digital service systems requires more democratic control of those systems. Society, perhaps due to the emergence of social media, has also become more demanding about explanations for government decisions. Since the complexity and the interdependencies are considerable, there is a challenge for the auditing of such digital systems.

Demarcation of Legal content professional knowledge versus the topic of research

The scope of the research has been the position of a business manager in a legal labyrinth. This problem space has been addressed from a perspective of technology support and not from the perspective of the legal professional. This pragmatic choice automatically implies a shortcoming with regards to the recognition of an entire fields of research that address the improving of the regulative framework as such. An example of such attempts in the domain of spatial planning and environmental protection is the decades of debate about the Dutch concept of ‘inrichting’ (facility) that connected the business managers activity, the permissions allowed and the environmental norms applicable to the facility-type of his desired activity (Uylenburg, 2014). I have used the IMRO ‘land use function’ as the matching mechanism between business activity and location, but this is a simplification of the problem space, when regarded from the perspective of the legal professional. This is also true for

In the Netherlands, some spatial legal processes are made digital by law and some, such as environmental, water management and traffic law are not (yet). This complicates matters because the professional has to base decisions and choices partly on digital means and partly on paper. This hybrid situation is also complex for appeal situations, where all relevant information about a case should be already be present and the higher courts only seek to assess the judgements made in the conflict. Gathering all revelant information is regarded as the job of the applicants, not of the court. The above illustrates that information retrieval is a complex professional task and transparent content maintenance is vital for all actors. (source: J. Perk.)
the decision matrix that was used in Chapter [VII] and [VIII]. This dissertation is not meant as a contribution to that professional debate, because this should be left to those experts. It should be noted that the demarcation is a grey area and one cannot avoid skimming the surface of that territory. I hope this research will make the world of technology support and its design issues more accessible for those professionals. The essence of a good design is to allow for the right level of detail and for capturing the complexities involved from both the perspective of the technical service and from the perspective of the design of the norms and regulations themselves to achieve a well-balanced decision process (‘Integrale afweging’, Uylenburg, 2014). In my view, these worlds are now too separate.

Matters of Staging

Technology support could be more effective at certain stages of the policy-making cycle. The evidence shows a preference for technological support at the earlier stages and increased need of transparency at the decision stages. The efficiency gain of even a small decrease of corrective action at the implementation and enforcements stages are considerable. There have been many attempts to identify the contributing factor of technology to participation and eDemocracy (A. Macintosh, 2004, V.Tundjungsari, 2011, H. Ali, 2012). My research does not support the role of technology at the decision-making stage itself, however. The results suggest support at preparative stages and explanatory stages and technology could support any stage where alignment between stakeholders is relevant. Interest balancing as part of co-regulation should therefore be diversified into exploration, opportunity finding, consideration and prioritization, before negotiation and decision-making. Staging definitely plays a role in the potential of technology, but the topic requires more research. The relevancy of staging in the policy making process was not the topic of this research, but it played a role in the interpretation of the results. On hindsight, I would have liked to have incorporated more distinctions regarding staging in the questionaires. I showed that technology could support consideration (eConsideration) thus supporting the idea of Habermas, Oosterhout and Carver. I prefer the term ‘eConsideration’ over terms like ‘deliberation’ or ‘exploring negotiation space’ to emphasise the active use (a speech act) of technology by actors that are investigating the gradual extend to which plans of other actors are jeopardised before entering the final decision-making stage.

Is there scope beyond spatial planning?

The domain chosen was legislation in the physical domain in government and administration. The research conclusions could be extrapolated to other legal domains beyond planning and environmental law. An example is the domain of public safety, where I currently have the role of National chief information architect and can substantiate the similarities of the domains from a technology perspective. It can be argued that the aspect of ‘location’ and its role in society is increasing – which shows by the wide use of Google maps and apps that work on top of these maps, localized traffic control, the internet of things and
RFID chips in products and shops – and that therefore ‘location’ oriented technologies will play are more important role in other legal domains. This has not been investigated in this research, however. The choice for the INSPIRE case should help to at least broaden the scope beyond the Dutch situation for the other European countries.

**Interface and maps as a challenging part of the operationalization**

The map-based technology solution proposed also confronted me with the scientific challenge of human computer interaction measurements. People appeared to ‘jump’ from map based interfaces to text based interfaces without so much as a hint of conscious ‘shifting of gears’. It proved interesting to discover the ins and outs of the ‘affordance’ provided by maps. The investigation about maps also turned out to be interesting. There is evidence that digital Maps were considered supportive, but there is also evidence that this technology requires some time to get acquainted with the ins and outs of such supportive systems and the use of case content and policy-making protocols. This has influence on the target group of actors and it supports the need for more continuous co-regulation rather than Ad-hoc participation efforts. Ad-Hoc processes require simple supporting technology that can be learned instantly due to the characteristics of the use of the internet. The application of maps as potentially helpful technology is addressed in the next chapter about further research.

**Iterative design at several levels: software, service and research**

One of the developments during the research was the application of the iterative design approach at several levels. This approach is quite common in modern software design, but it is not common in legal service design. In software design, increased complexity is matched with clear design goals, more user involvement, transparent procedures and explicit considerations during the building and adjusting. One of the conclusions of the research is that designing legal services should be done in the same way with stakeholders, legislators and technicians. I have mentioned in Chapter [VIII] that iteration is vital where domain knowledge is translated into software business rules. Iteration also enables experts to discuss technical possibilities against user needs, a process that cannot be achieved using traditional tendering procedures. Another level of iterative design was the living lab approach for the conceptual explorations, the use cases and the experiments. I will elaborate on the living lab approach below. A recent addition to the concept of iterative design of law is provided by a number of Dutch politicians, who state that ‘the Dutch law is constantly written by Lobbyists’ (R. van Raak, SP member of parliament, Volkskrant 2015). It is both a political and a scientific question if this is to be regarded negatively. The NGO on environmental protection even states that they ‘wrote the new law on climate protection’ in 2008, which was submitted by the PVDA party in 2015 (I. Teuling, Volkskrant 2015). It is therefore interesting to investigate where co-creation stops and where ‘lobbying’ starts. This is the domain of political science, but it will influence the design of legal services as well.
The Living lab research approach

In Chapter [VII] I have promised to reflect on the use of the living lab approach. I will use the matrix of Allen and Stefan to elaborate (2011). See figure 3.

The Living lab approach applied for this part of the research was very time consuming, intensive and took a long term perspective on the investigation of a wicked problem (how does one provide better legal services with the help of digital technology?). From a legal perspective, the living lab approach proved promising. Some contemporary researchers argue that eGovernment services for environmental permits using SDI’s is a simple must (M. Latre, 2010). But with Nuojao, I observe that tools and especially legislative tools require co-design and trust. The tools and the regulation cannot be designed in isolation and without the actors. The living lab approach, however costly and time consuming as it may seem, does create a context for more mutual understanding, than traditional (waterfall) design methods. The same could be said about the legislation. Given the increase in complexity of our society and the increasing blaming culture, the more actors are made responsible for the outcome of the legal design process the less they can blame government as described in Chapter [II] by Grimmelikhuijsen (Grimmelikhuijsen, 2012, P. 20).

Figure 3: living lab description by Allen Stefan, 2011.

<table>
<thead>
<tr>
<th>Lab research (user labs)</th>
<th>Action research</th>
<th>Living lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controled environment</td>
<td>Real world setting, yet typically confined to an organisation or department</td>
<td>Real world setting, involving multiple stakeholders from multiple organisations and their interactions.</td>
</tr>
<tr>
<td>Limited, clearly assigned role of users</td>
<td>Not specific about user role</td>
<td>Active role of users as co-innovators; exposing technology to the creative and destructive energies of the users; facilitating dynamics of collective action.</td>
</tr>
<tr>
<td>Designed for replicability</td>
<td>Active (social and political) role of researcher in the research setting</td>
<td>Multi-disciplinary research teams actively involved in the research settings, confronted with the technical, social and political dynamics of innovation, at times even driving the agenda.</td>
</tr>
<tr>
<td>Designed for observation of outcome</td>
<td>The researchers observe and take part in the creation of an outcome</td>
<td>Joint collaboration to create a desired outcome.</td>
</tr>
</tbody>
</table>
The living lab research approach seems interesting for the legal research domain. It already is gradually penetrating in the policymaking domain (R. Wilson, 2014), but few investigations seem directed at co-regulation with legislators. I do not think this investigation could have been done in a different way. It seems hard not to become involved when finding the match between technical development and the moderator/actor issues. Nuojua’s later findings, lead to similar conclusions about co-regulation, eParticipation and co-design by stakeholders, both in technology and in the law. “New Web-based methods of participation should be designed to enhance, and not to replace the traditional ones. In future, WMM and the reference group should be developed more tightly together as they seem to have a natural connection. Due to their skills and positions in the planning process, members of a reference group could also contribute beneficially to technology development”. (Nuojua, 2010). The same is supported by other Finnish researchers like Saad Sulonen: “The research problem addressed in this paper is concerned with the lack of open and adaptable ICT solutions for citizen participation in urban planning. We argue that a collaborative design approach to ICTs for citizen participation enables the creation and adaptation of tools to the work practices of city planners, as well as to the needs of citizens, which make ICT-mediated participation efforts more relevant”. (Saad Sulonen, 2010). Nuojua makes a convincing case for encouragement of empirical field work.

The Living Lab Research Approach (LLRA) did succeed very well in a number of aspects:

- Real World setting
- Involvement of actors
- Involvement of users as co-innovators
- Multi-disciplinary approach
- Take up of the research outcome

In addition I can mention:

- The Organisation of the research environment improved with the engagement from the actors.
- Involvement in the research process of the actors.
- Funding of the research because of increased user involvement.
- Demonstration of the research outcome in conferences.
- Commitment over a (long) time from both sides.
- A feeling of the legislator to be ‘in control’ again.

One of the reoccurring issues during this research effort has been the need for a multidisciplinary approach to solve a societal challenge on the one hand and the threat of superficiality that is caused by addressing too many domains of knowledge on the other. It is impossible to achieve specialist levels in all disciplines such as ontologies or spatial law or sociology. In my view, the Living lab approach provides an acceptable compromise to
moderate that threat, because it did bring many experts together as a multidisciplinary team. This had impact on the quality of the designs. Unfortunately it is not always reflected in this dissertation, since it is written by one person with limited expertise.

As the weak points of the LLRA, a number of aspects are mentioned, which I will briefly discuss here.
Hardly replicable
I think the lack of replicability is a valid point of critique on this approach. The case may be representative for the purpose. The actors may be representative for the normal stakeholders in such a situation. The case could be seen as representative for other countries, given the European nature of the INSPIRE regime, but replicability is hardly possible. No research environment will be the same. By providing a detailed description of the whole process a researcher can offer the material to create a near-similar situation for the sake of falsification and further research.

Effort
The approach is time consuming and requires long term planning. Furthermore, such approach is quite dependent on the willingness of the stakeholders to be involved in an experimental environment, where the outcomes of their efforts are quite uncertain. Building trust relations with the stakeholders requires attention throughout the entire enterprise.

Research bias of the researcher
Researchers in living lab research are typically deeply involved and may tend to look for supporting evidence supporting his theory and neglect contradictory evidence. Perhaps even more than in other research approaches, the research findings should be presented to other researchers for critical feedback for that very reason. The literature search should include a search for arguments that contrast with the presumed findings, especially when empirical research findings about the subject are scarce. In this research I hope to have convinced the reader that I am aware of my position and have remained critical towards my findings.

Validation in general
The LLRA method was used to achieve a certain research goal. Validation has to be viewed in the perspective of that goal. The goal was to support the claim that technology, if designed properly, can strengthen the legitimacy of Law, especially when that technology is applied for co-regulation. To ‘design properly’ was translated as co-creation of that technology according to the proper rules of architecture. The evidence using a mix of validation methods supports that claim. To prove that this specific technology would be the best solution for the use case would require a much more controlled experiment. I think the combination of living lab research and quantitative lab-controlled research for themes like interface design and service design could be valuable for further steps. Such research could be supported by monitoring users and the way they use websites. In social media research, the phenomenon of ‘voting with your feet’ is well known. People tend to use software that works. This brings us to chapter [XI]. A logical next step from co-regulation would be to investigate self-regulation enabled by technology and facilitated by government. The next chapters will explore some area’s for further research, that have to do with the metrics of legitimacy, the notion of self-regulation using Legal Apps and the role of governments in such an environment. I will conclude with some recommendations for government.
Further research & recommendations for government
Relevancy of the issue after 10 years

It is now 2015. Eleven years ago, in 2004, our team built www.overheid.nl, the National access point for government information. It was supposed to be a help for citizens and business managers to find relevant information in relation to their use case. The technology failed to achieve its goal, however. The inadequateness of this official support system to help a business manager with an LPG gas station allocation problem inspired the build of Addwijzer to visualize the map-based access to legal information. Map based access to information was not so common then. Technology based services have developed quickly in the recent past, however. During the following years, TomTom, Google maps and the iPhone have made the use of the digital map a part of the common daily toolbox of citizens. Ten years later, parts of that indignation are still valid and the sense of urgency that has driven this research has even increased. While private digital services (Apps) are expanding at great pace, and modern technology is used in some areas such as for processing tax returns, the government service level that would allow for citizens and businesses to actually access their obligations and permissions is still lagging behind. In this dissertation it has been argued that the challenge is not to push legal source material to citizens. Unfortunately we have seen too many applications of technology directed at pushing legal sources to citizens. Such services are reasoned ‘from the supply side’ (which is usually government) rather than from a demand side, that represents the needs of that citizen. So why is the latter service perspective on legislation more relevant? Why should governments enable a business manager to receive an answer to the ‘where-can-I-do-this’ question, rather than the ‘what-can-I-do-here question?’ In my research I focused on knowability of law from a user-centered perspective because this is an important aspect related to the notion of legitimacy in view of the European Commission (see Chapter [I], page 10) promoting ‘a client-centered approach’ towards eGovernment services. In the early days the client-centeredness or quality of eGovernment services was simply measured by counting websites (see fig x).
While the service levels are still questionable more than ten years after I have started my research on this topic, the pressure for explanation of the appliance of rules has only increased. In general, Western governments are faced with an audience of citizens that is both more sophisticated and more demanding. Social media technologies have empowered citizens both to communicate among themselves and to communicate their critique about government to the whole world. The power of the social media is demonstrated every other month, varying in cases from citizens fuming about poor African children denied protection of asylum, to pressure groups fighting against wind mills built in areas where investors preference were clearly more influential than the concerns of the 'locals'. The need for transparency and explanation about the process of a fair balancing of interests by the government has become a challenge. The question if Technology can assist in that challenge is growing more relevant.

The use of technology by citizens to question government and its system of Law is obvious. It is also obvious that there is no return to paper-based government processes in a time frame where paper stamps have gone extinct and postal offices have been dismantled. The fact that the Dutch National government has recently de-centralised a whole range of policy sectors to the municipal level, is believed to spark a tsunami of appeal cases (estimation 1300 in 2013) for the State Council (Raad van State, L. Aarts and Douma, 2011). There are again serious concerns about the new completely digitalised ‘omgevingswet’ that is to become law in 2018.I will elaborate later in this chapter. One is conscious of the fact that without
adequate digital process history, the whole permit structure may become unstable and holes in the digital dossiers will render protection against questionable cases indefensible before court. However, one cannot imagine such a workload handled by paper processes. Should that government then in turn make more use of digital technology to relief that pressure? A more productive strategy for the government can be found in applying the same social media technology for enlisting the citizen more in the designing and balancing process, thus building support for the legal system rather than opposition against it.

The explorative research in the ten chapters of this dissertation indicates that technology can be an enabler of improved legal information sharing and co-regulation. I have tested only certain types of technologies for certain application areas, but the potential of technology seems real. Many researchers have discussed the application of technology in the context of policy making. There is a constant and heated debate about the extent to which technology could bridge the gap between government and the citizen. Proposed solutions differ from small improvements of services to technology enabled democratic utopia. A design approach, and especially a design approach that is based on a living lab method, does not provide solutions for that far too abstract debate, because the answer would always be: it depends on what bridge you need for which gap. The recent debate in the Netherlands about ‘failed ICT projects’ is also clouding the perspective on the real challenges of digital bureaucracies because of its black and white character. The design approach described in this thesis could help to improve legitimacy and bridge that gap in small steps and decrease the chances for ‘failed ICT’. There are a number of issues and research challenges that should be discussed, however.

I will first address nine issues that could lead to further research. Then I will provide a range of recommendations for government. The chapter will conclude with the impact that resulted from this research and finally Marcuse will be given a voice about its results.

11.1. Nine Issues requiring further research

I will now provide nine issues that arose from this work that could inspire further exploration and research. The issues address three levels of challenges:

Those that are related to Legitimacy and technology

- Legitimacy, technology and the challenge of defining a metric
- What can be said of Le contrat social: is it being reversed or is it being modernised with the help of technology?
- Policy making is equally important as policy implementation.
Those that are related to government services and technology

- Legal infrastructure and ‘legal interoperability’
- Maps and law
- Service infrastructures for law: room for public-private partnerships?

Those that are related to technology and law

- The Digital Bureaucrat and Law
- Computer says Go! : The Legal profession and technology
- The threat and the challenges of alienation

11.1.1. Issue 1: Legitimacy, technology and metrics

I have found no theoretical base for a clear metrics for increased or decreased legitimacy that could be used for hard measurement against legal service infrastructure functionalities. One approach to the metrics of legitimacy is that of eParticipation. Saebo states that measuring the contribution of technology to eParticipation is impossible without a better metrics of the goals one wants to achieve. ‘The lack of well-considered objectives may contribute to a relatively poor success rate, and certainly makes initiatives hard to evaluate’. (Sæbø et al. 2009). The much quoted and much criticised 2001 OECD model of participation provides some support for the metrics of participation ‘Public consultation improves regulatory quality’ (OECD, 2001, P38). Future research could indicate the relation between technology and legitimacy by building on the ‘OECD extended participation model enabled by GIS, as proposed by Berntzen, as suggested in Chapter [X] (Berntzen et al, 2005). The OECD-model was based on the normative model of Sherry Arnstein (see chapter [VI]). The later version of this report signifies the importance and the lack of for clear evaluation models and instruments, however. ‘It should be noted that those observations are seldomly based on comprehensive evaluation of the impact on governments and citizens in using these new tools, nor of the effectiveness of ICT’s for strengthening the government-citizen connections’ (OECS, P68). For metrics the report only offers three criteria based on the ‘Common Assessment Framework’ (CAF 2000, which is derived from EFQM for public management):¹⁴⁹

- Improvement of ‘oneness’ of the government
- Improvement of access to services
- Actions taken to empower citizens

The 2013 version provides somewhat more precise (self-) assessment criteria, but it is still hard to connect with criteria to evaluate legitimacy:

- The ability to address individual solutions (CAS 2013, P42)
- Social responsibility and environmental sustainability (Cas 2013, P48)

Both Sheffield, 2007 and the OECD report mention stages in the policy-making cycle (OECD, 2001, P83). Carver, Wyner and I link this staging to the potential of technology and a further diversification of collaborative design processes.

11.1.2. Legitimacy and societal costs

Some efforts to increase the legitimacy of government regulatory systems during their introduction are addressed at demonstrating the expected ‘savings’ by different stakeholders in society. This approach to legitimacy is based on ‘business case’ and other efficiency paradigms, that I addressed in Chapter [II]. The underlying assumption is that legitimacy of new regulatory systems and standard working processes can be increased by achieving a decrease of government administrative costs.

In 2004, at the beginning of the DURP spatial planning standardisation programme, a consultancy company was asked to perform a business case study for the Ministry of Spatial affairs to see what the benefits would be for cities. The investigators came up with ‘several hundreds of thousands of Euro’s per year for an average city of 35,000 inhabitants (Quarant, van Bohemen 2004). Being a thorough company with a good past performance history, they may have been right. However, no-one – as far as I know – has asked and paid the investigators to substantiate that claim yet, while 11 years later we must have seen the effects of the DURP implementation. The reason is that those investigations are often used as a convincing argument rather than as an objective measurement of benefits. When the policy changes, new investigations are done, but most of the time, no-one seems to care to look back (Bekkers, 2001).

A similar approach to the development of a metrics for legitimacy is that of societal costs. Below I will describe some approaches for the legitimacy costs of law and legal services.
Satisfaction costs: Cost for the user in a use case scenario

I set out to increase legitimacy through improved access to law, which developed into knowability, with aspects as improved case assessment and constraint satisfaction. These ‘services’ should contribute to the notion of a citizen and a business manager to behave co-operative. The contribution of technology to those services is measurable at the level of the service in relation to the specific use case. This approach should provide metrics of user satisfaction of specific services.

Tax payer costs: Costs for the citizen as tax-payer

Costs can also be defined as more efficiency and budget cuts that decrease the tax costs of government. In chapter [II], I have defined the metrics for ‘efficiency’ and ‘effectivity’ and ‘client centeredness’ to determine if a public service is well designed. This was based on van Duivenbode’s and the European Commission’s definition of a service chain (Duivenboden 150, 2001). Efficiency and cost savings – however seductive in times of budget cuts – can be a dangerous line argument for collaborative design of services. Duivebode, Lips and Bekkers describe what they call “the legitimacy paradox”, which I also mentioned in chapter [II]: “While trying hard to improve the “economics” of government by focusing on e-government services it could be the case that – as a result of insufficient citizen participation in policy processes – the legitimacy of government is decreasing at the same time. This can be considered to be the so-called legitimacy paradox of e-government strategies: trying hard to improve legitimacy through better services and yet losing territory exactly because of that same focus” (Fountain, 2000, as in Bekkers, 2001b, Duiveboden and Lips, 2002). The viewpoint from the tax payer also unveils another problem of current design processes: fragmentation and lack of integration at the multi domain level. The Dutch government is divided in many sectors and jurisdictions. Negotiations about the boundaries and responsibilities among those government agencies are without end151. The situation is worsened by continuous reorganizations where slices of governmental tasks are distributed and redistributed at regional and local level. The spatial view from a taxpayer immediately confronts the government with its own lack of internal collaboration and continuity.

Conflict management costs: stages and costs in the policy making cycle

The main driver for experiment [III] was the strong opinions of NGO’s as expressed by Mr Wout Sterken (see page 26) regarding the futility of ‘ending up in court and winning half of the cases’. NGO’s seemed to prefer more consensus building at the preparative design stage. This position is supported by my research. The NGO position statement would indicate that the contribution of technology to legitimacy of law based on the variables ‘overview of related

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150 My respects to Hein van Duivenboden, who recently passed away at the age of 48, suffering from ALS.
151 This statement is made on the bases of my daily practice as government officer and earlier careers.
discussions’ or ‘chances for ending up in court’ is not a nominal scale, but an ordinal scale based on stages in the process as described in chapter [VIII]. The views on ‘legitimacy costs’ or the erosion of legitimacy of law (rephrasing Jürgen Habermas, 1975, P.68-75, 1984, P.339, Saxe 1868) cannot be stated in such simple terms as timing in the policymaking process. There are enough famous examples, like the Korenwolf (see Chapter [I]) where the loss of legitimacy was associated with the implementation of the habitat directive in a way that was logical from a legal point of view, but at the same time was very hard to explain to the public. The contribution of technology to legitimacy could have been in the explanatory power rather than the avoidance of court. The metrics for legitimacy could be societal costs such as needles or ineffective conflict resolution in court. Timing seems relevant to legitimacy. This scale of legitimacy costs and its significance requires further research.

As stated in Chapter VI, I have found no appropriate metrics for societal costs of failed policy making or legislative imbalance. The expression of perceived societal costs into ordinal or interval scales seems still arbitrary at this stage of the research. A European Commission eParticipation report suggests that transaction costs are part of the motivators for government (Millard and Macintosh, 2009). It could be that transaction cost theory could provide more clarity on the subject, but it was beyond the scope of this research claim to develop such a scale. A transaction cost approach would probably only cover a small part of the costs of lost Legitimacy.

**Monitoring and Enforcement costs**

An assumption that is related to the staging model is that an unbalanced result in interest balancing and legal design at an early stage, affects a larger population at the implementation and enforcement stage and more effort for repair and maintaining consistency. It is also plausible that during the policy implementation stage, a number of cases will arise, where compensation and opportunity finding is required.

This staging model and the digitalisation of government processes is especially relevant in the light of a new tendency of Dutch (and other) governments, where under the ideological notion of a ‘retreating government’, more and more ‘freedom of choice’ is given to the citizen. The new Dutch ‘digital omgevingswet’ is designed to cater for that ideology and to facilitate the citizen to have an easier permit acquisition process. However, there is a huge implicit shift in enforcement costs involved. Where in earlier days the permit requester was forced to pay for the research and design efforts in advance of the government process, now this government (thus all the tax payers) will have to carry the burden of the enforcements costs, including the research and other inspection costs for years and years after the permission was granted. It is unclear how the government will digitally maintain all the data that are required for the adequate legal substantiation of an enforcement action against a case that violated the policy intentions. It is yet unclear if and how this shift will turn out for the better of the tax payers.
I conclude that it is feasible to measure legitimacy issues from a technical perspective and a communicative perspective, but it seems hard to measure legitimacy issues from a perspective of societal costs, without better theoretical fundaments about how those costs are perceived. This problem occurred when the question in experiment [III]: ‘avoid ending up in court’ came to play. The stage model proposed does offer some direction for this future research. Some of the same problems occur with the research on transparency (Grimmelikhuijsen 2012, Meijer, 2012).

Further research about metrics for service delivery and legitimacy is required. This is perhaps even more relevant for services regarding legal information provision. These metrics should address:

- improvement of legal knowability
- improvement of legal services
- improvement of co-regulation and eParticipation
- the relation between stages in policy making and technological support

The costs of failed ICT projects as a challenge of reducing complexity

One of the less obvious conclusions one can take from this research is that the translation of policies into digital services is a task that requires a huge effort of complexity reduction. The level of public criticism about the amount of failed governmental ICT-projects has recently led to the establishment of the Dutch parliamentary committee ‘Elias’ that resulted in an advise about a number of control measures. These actions as suggested by the committee could help to prevent future failures. However, there are some more fundamental questions to explore:

- The concept of a failed ICT-project suggests that the tasks can be designed in the isolation of a project. The arguments for an infrastructure and a common architecture have been put forward in this research. The Ministry of Infrastructure and environment (I&M) is aware of this problem and wrote the report titled ‘De laan van de leefomgeving’ (Ministry of I&M, 2014) promoting this argument. It is a question if other Ministries have the same awareness level about the interrelatedness of many digital versions of related tasks within the bureaucracy, requiring a multi-sector and multi-domain approach.

- One could question the decision to automate a government service at an early stage when the complexity that would have to be reduced could be regarded as an inkling of the potential success of the project. Ashby wrote the law of requisite variety (Ashby ’56-’58). ‘If a system is to be stable the number of states of its control mechanism must be greater than or equal to the number of states in the system being controlled’. This law states that the governing system should be at least as complex as the system it is to govern.
Looking at each step in the complexity reduction process during traditional design methods, a number of observations can be made:

1. The translation of general policies into models of influencing reality cause a loss of variety and granularity in view of the intentions of the policy makers.
2. The translations of those models into norms that are applicable to most cases cause a loss of variety and granularity from the intentions of those policy maker.
3. The mapping of the model, norms and use case descriptions into a design of functionality causes a loss variation and granularity.
4. The tendering procedures cause a loss of variety and granularity in view of the tendering agents.
5. The translation of functionality as described in the tendering procedure documents into the actual build of technology causes a loss of variety and granularity.

In the end, the level of complexity that can be handled with enough variety and granularity by automation is only a small subset of the actual cases. In other words: one should not attempt to automate or digitalize services for cases that are more complex than the design process can handle (design defined here as the reduction of complexity). This means that those cases have to be tasks with a high frequency, to make it worthwhile. One of the manners in which the design process – or reduction of complexity – can be improved is by organizing it in short iterative cycles, where more complexity is added in small quantities at the time.

11.1.3. Issue 2: What can be said of ‘Le contrat social’: is it being reversed or is it being modernised?

Does our findings about the contribution of technology indicate that Herbert Marcuse (1968), Noam Chomsky (1988), Heeks (1998), Kraemer & Dederick (2002) and other critics of technological uptake are wrong? Should we take the optimist view on technology and its future role for Law? Would Marcuse now have said the same about the internet as he once said then about TV? “The people recognize themselves in their commodities; they find their soul in their automobile, hi-fi set, split-level home, kitchen equipment.” (Marcuse, The One-dimension man, (1964)) Would Chomsky see the internet as the way for governments to argue the need for their authority or to manipulate the public into a false believe of authority (Chomsky, manufacturing conscent,1988)? The arguments that Jean Jacques Rousseau – one of the Founding Fathers of the concept of ‘Le Contrat Social’ – used to take the position that man should hand over power to government – have to be put into the context of his overall views at that time.

The main ideas expressed by Rousseau can be summarized as follows:

- Rousseau separated government from administration.
- Government was the will of the people.
The ideal political process (based on the Genevan model of his time) was direct democratic consensus. The will of the people was law and protected citizens against the egoism of other citizens. He distrusted Nation-states and preferred smaller city-states, so there might be a matter of scale involved.

Figure 2: cover of Leviathan, Hobbes.

Government should therefore never become a separate power from the people, in Rousseau’s view (Rousseau 1662). Rousseau and other founders of social contract theory, such as Hugo Grotius (1625), Hobbes (1651) and Locke (1689) all address the ‘natural right of the individual’ versus different forms of consent to hand over – legitimate – control to government and independence of the Church. It was not earlier than in the 20st century that the notion of bureaucracies was introduced as a power in itself (unless one defines catholic church as a bureaucracy, which was not entirely untrue during that period, of course. And Hoogwout argues that the emergence of ICT resulted in the first significant debate about service concepts between government bureaucracies and citizens (Hoogwout quoting van Dijk, 2010, p.81)

This more modern debate about government and law is less naïve about bureaucracies and governments as separated entities. Complexity of society has increased since 1662 and Le Contrat Social, including the notion of service levels and co-creation, requires modernisation. It is interesting that the debate between Rousseau and his peers was partly about the difference between direct relationship between government and citizens and the indirect representative forms, however. This is interesting because technology enables a more direct relationship and some even believe that social media is now much more powerfull than elected parliaments.
The question for further research is how these different perspectives help us to regard technology as means of communication and services delivery between government and citizens.

One the one hand I follow Verbeek and would state that evidence provided by this research supports his view on engagement rather than a pro-versus-contra position (Verbeek and Kiran, 2010). The experience with the living lab co-design was positive and has revealed a first glimpse about what could be made possible to bridge the gap between the citizen and law. The citizen that surrendered power to the state in the terms of le contrat social, could be convinced a bit more to behave civic, follow rules and accept the higher authority if that authority applies well designed technology.

On the other hand my research also teaches some humility. The ‘nonchalance’ that accompanies the implementation of digital systems replacing paper based systems without proper accompanying and explanatory measurements borders on arrogance. The increased corrective working load on the Raad van State is an illustration of such a trend and can only erode the ‘standing’ of Law and government. In Chapter [III] I have shown a model of van Engers that indicates a tension between the political wish to steer society with more and more laws, while there is an administrative apparatus that has to cope with the complexities of all those rulings. As a result miracles are expected from the technology to cope with that complexity (van Engers, 2012).

While my research shows that technology could be used to modernise ‘Le contrat social’ many questions are still left open and would require further research. Future Research questions could comprise questions such as:

- What are the factors that contribute to collaborative design processes of technology in the domain of law?
- Could the ‘living lab’ approach be the method to engage the legal professionals in design?

The debate on the impact of technology on ‘Le contract social’ will probably never stop. Some heated debates are still going on about the extent to which technology enabled co-creation is more than consultation of the authority to keep up the appearance of legitimacy (Howe, 2014).

Habermas, communicative action and mutual consideration technology

As power alone cannot grant its legitimacy in modern society, law derives its validity from the consent of the governed (Habermas, 1997).

For operationalization of the relationship between legitimacy and technology, I have chosen the communicative action and discourse definition of Habermas, which is defined in terms of boundary conditions for discussion:
Common understanding.

Communicative discourse.

Transparency.

Harmonisation of plans of action based on common situation definition.

In retrospect, the theories of Habermas did help to create a bridge and conceptualise broad themes like legitimacy, technology and Law. The technology used in the experiments reflect his views on the challenges of Legal systems between the life world (lebenswelt) and the formal representations of norms. It is clear that accessibility and knowability of legislation is relevant to bridge that gap and that technology can enable more effective searching for relevant regulations and case assessment. If people cannot find the law, legitimacy could become troublesome. It is also clear that, from a government perspective, the service of legal effect planning and opportunity finding is a contribution to that legitimacy, as it enhances support for the legal system. My research shows that if the business user and the producer of regulations can map their business goals and their policy goals against a consistent legal infrastructure of regulations and procedures, support for the legal system increases. The fact that such an infrastructure has need of architecture and maintainability is not related to Habermas, but rather to modern thinking in ICT design. A less gratifying finding of this exploration is the fact that the findings of Grimmelikhuijsen (2012) could be applicable for many government service improvements: they have the character of dissatisfiers. This means that no politician will become elected because of improved services. People might blame the same politician for bad services, however.

The answers to the survey questions in Experiment [III] unveiled additional versions of the notion of interest balancing as part of co-regulation. The cursor-attached spatial plans were seen as a contribution, but not to the stage of decision making, but to the stage of exploration and - what I call - ‘consideration’\textsuperscript{152}. This is the stage where a citizen takes into consideration the amount of intrusion his plan for a location would cause to the plan of another citizen. The digital technology is capable of rendering this gradual comparison in ways that paper could not (see also McCall 2003).

From my research that was based on Habermas views on legitimacy, we can deduce that some aspects of balancing interests as part of co-regulation can be improved with digital (map) technology to support legitimacy. These improvements are:

- Opportunity finding against existing legal constraints
- Consideration of plans in light of the plans of others
- Visualisation of negotiations space like ‘seeking area’s
- Visualisation of prioritization

\textsuperscript{152} ‘consideration is also a legal term in some jurisdictions that means ‘fair value’ in relation to a contract between two parties. I use the term in the sense that one person actively takes the interests of others into consideration (inachtneming). The term ‘negotiation space’ used in Chapter [VIII] is too much associated with the decision stage.
There is an urgent need for intensive research involving both technologists and legal experts on that theme. This research might help the legislator to improve ‘consistency’ and limit ‘instability’ that is the consequence of having to wait for the outcomes of endless legal debates and appeal procedures before being able to know what the ‘right’ balance of interest is. Our ability to create knowability of Law and to automate parts of policymaking has vastly increased since the days of the early printing press (see Chapter [II]). Some aspects of Law like the one that provide stability and equality before the law need to be re-thought and with some sense of urgency.

Carver and Wyner (ref) argue for a relation between technology and stages in the policy making process. A combination of a participation model with more granularity and well defined stages in the policy making process is needed when we want to evaluate the contribution of technology to this policy-making process. This would also help to solve the issues mentioned by Sheffield about the metrics of such evaluation (see Sheffield, 2007).

We have observed that governments nowadays gladly delegate this technology-empowered mutual consideration aspect to citizens using the argument that it is the citizens own interest to find consensus and that citizens are capable of managing the required deliberation processes themselves. Habermas would find such ‘mutual consideration technology’ an enhancement of what he calls a ‘speech act’\footnote{There is a whole field of research that addresses ‘speech acts’. For this research it is only necessary to realise that the act is a conscious decision for a specific disposition, see also Winograd&Flores: Understanding Computers and Cognition: A New Foundation for Design, (1986).} in communicative discourse, or a medium for reaching understanding, common situation definition and harmonisation of plans of action. (Habermas, communicative action 1987, P 308). Experience shows that reaching and maintain consensus about new spatial designs is not easy. The term ‘consideration’ implies an act of taking into account the interest of another party.

The field of research between digitalization and Law has been the domain of a few specialists and some eGovernment front runners that have specific communities organizing conferences on the topic (examples of such communities are ICAIL, JURIX, EGOV, see also http://www.leibnizcenter.org/). The topic should however become a main stream topic in any course on public administration, in my view. In the next Chapter, I will provide some recommendations for administrations that stemmed from this research.

With respect to the mutual consideration technology, some research questions evolve from this research, including:

\begin{itemize}
  \item Can the social constructivist approach of Habermas (who was accused of naivety by Foucault in 1986<ref>) be a basis for legitimacy where active citizenship (beyond voting, behaving civic, obeying rules and accept authority) implies co-design of solutions for problems like Nimby and resource allocation issues?
  \item What mechanisms and conditions are required for crowd sourced legislation\footnote{See also: http://openministry.info/}.
\end{itemize}
Is crowd sourced legislation the beginning of an alternative – civic – bureaucracy in parallel of the ‘official’ bureaucracy in the sense of Weber’s ‘craftsmanship of the bureaucracy’ (Weber 1921, P 128)?

Is eConsideration indeed a more appropriate term than eParticipation?

In what ways could modern government - as the required impersonal bureaucracy according to Weber, Habermas and many others - delegate parts of its role back to technology empowered citizens?

Could the transformation from a paper based bureaucracy towards a digital bureaucracy imply that completely different control mechanisms are now necessary?

Technology cannot solve everything, of course. The consensus among farmers and with government about innovative ‘Terps’ as a means to keep the farmers in an area that was designated to become flood buffer area turned sour after 15 years of negotiations with the government about financial compensation rules among 10 farms!155 The process resulted in two heart attacks and stress among the farmers. Technology cannot solve problems of effectivity.

11.1.4. Issue 3: Policy making equally important as Policy implementation

There is a growing awareness of the falsehood of implementation as inferior government activity to policy making. Many others have pointed out the demise of New Public Management, a performance oriented school, and its artificial and unproductive split between policymaking and policy implementation. “The practitioner theory underlying these changes is that politicians should stick to their core business, that is, developing new policies to realize (political) goals. Osborne and Gaebler’s (1992) adage was “steering not rowing.”156

A good example of the lack of attention for implementation is given by the Tax office: The chief-administrator that was responsible for the TAX reform in 2001 wrote about the new reform in 2014: to change the tax deduction of the mortgage and making a distinction between old and new cases is impossible! The distinction is far too complex. No-one knows what should be a new case and what would be counted as old case, after a while. Politicians create law without thinking about implementation and feasibility and the Tax office takes the blame (Volkskrant 10 mei 2014). This same tax office decided to abolish paper procedures (called the Bleu Envelope) altogether while processing 700.000 tax cases per day and 120.000.000 per year (Volkskrant, 5-2015).

Cynthia Farina described some interesting experience and research ideas concerning the Rule 2.0 or eRule-initiative which implemented the ideas of the Obama administration about transparency. This type of transparency especially emphasised the implementation

155 Peter Rooy overdiepse polder, Volkskrant, 8 September 2015
(defined there as rule-making) part of policy making. (Farina 2012, 2013, 2014 see also http://regulationroom.org/) and the ‘open government directive’ (OMB, 2012). 

The point here is that separation of the design of policy making and the design of policy implementation will cause failures in service delivery. The same phenomenon occurs with a separation between ICT design and ICT implementation. The combination of Policy implementation and ICT implementation leads to an accumulation of complexity. Such a piling-up of design challenges for service delivery should be met by modern and agile design practices that are now common in software design. This thesis has been written from a cyclic perspective towards a regulatory production process. This perspective does not allow for a distinction between policy making and policy implementation. A good example of this cyclic approach is the introduction of ‘Botsproeven’ (A.Nijenhuis) and use case analyses during the early design stage of the ‘Omgevingswet’ in 2015. The term ‘Botsproef’ (translates as crash-test) is a design policy with an ironic reference to the crash-tests meant for cars where local and regional authorities are asked to test parts of the implementation feasibility of the new law already during the legal programme design stage. Further research is required to substantiate the claim that this agile perspective supports legitimacy.

11.1.5. Further research 4: Service infrastructures for law: room for public – private partnerships?

The latest developments regarding technologies are social media and the so called ‘Apps’. At the start of this research work the concept of a ‘legal app’ was a futuristic idea. This once futuristic idea is now in fact implemented in the arena of thousands of digital Apps and social networks. In the second half of 2011, the Ministry of Justice in the Netherlands launched the legal app called wetten.nl. This was the translation of the existing legal database infrastructure towards the Apple platform. In 2013, an Ipad user counted 26 Apps from government and commercial suppliers about legal information. The eParticipation App or the eVoting App is not far away. On travelling websites it has grown quite common to use public reviews to determine a destination and voting or polling Apps are already sold for

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many purposes\textsuperscript{359}. It could be only a matter of time before a government agency will develop a ‘policy formulation App’ or perhaps even a ‘make-your-own-rules-App’. The fascination with the “legal App” does not stem from a populist view on technology nor a need to “join the hype”. The most interesting aspect of the App in the context of legitimacy of Law is it’s qualities as a bridge to the general public. The government is transferring functionality of the legal service infrastructure to platforms that are run by private companies.

**Figure 2: The early legal Apps: wettenbundel and wetten.nl, both freely downloadable from the Apple Appstore since 2011.**

There are a number of independent, but coinciding developments that support the notion that the general use of the ‘Legal App’ is sooner a matter of years, rather than decades. Some of these developments are:

- *The cross-fertilisation of government infrastructures and base registries*
- *The uptake of localisation in mobile phones and PDA’s*
- *The growth of “crowd sourcing” in many traditional government sectors, like safety & security, health care, hotels and banking*
- *Hybrid data infrastructures where governments create open data and private companies add value such as cultural heritage data\textsuperscript{160}*

\textsuperscript{159} [https://www.myvote.io/](https://www.myvote.io/) or [https://play.google.com/store/apps/details?id=otter.votter](https://play.google.com/store/apps/details?id=otter.votter)

\textsuperscript{160} [http://cultureelerfgoed.nl/erfgoed](http://cultureelerfgoed.nl/erfgoed)
The fact that Apple claims over 100,000,000,000 downloads of Apps and that there are over 3 million Apps\(^{161}\).

The progress of law as Open linked data\(^{162}\).

The availability of open linked data, such as open street maps, that is also used now for spacial planning.

Apps are clearly a successful user interface with an extremely efficient private delivery infrastructure behind them (for example iTunes). Content Infrastructures like Google Earth and interface platforms provided by Appstores have been connected leading to a fast growing amount of interconnected service networks. Google Earth geographic data has for example been made available by an App from the Apple App store and various Apps provided by the Android 4.x developer communities.

There are a whole range of research questions involved with crowd sourcing, apps and other social media:

Public private partnerships:

One of the areas of research is to investigate Public usage of those private service infrastructures. In 2005 Paul van Asteren at Rijkswaterstaat (Dutch Ministry of Transport) and I organised a workshop together with Google Earth about trust issues with respect to the use of Google Earth for Public road infrastructure data. Many experiments with geographical data already use Google Maps as an end user front end. The first Dutch well know experiment applying geographic data used Google maps in 2006 to show permit information regarding houses\(^{163}\). The idea of combining public needs and Market efficiency could be an interesting research area. There are issues of trust, privacy and the distribution of responsibilities in such a collaboration that are already emerging in ‘normal’ ICT services that are not related to law.

Figuur 2: the latest app on Legal information for business managers, 2013 (to the right) and Rechtsorde App, 2013.


The extent to which apps and social media actually empower citizens for co-regulation:

Hartz and Sullivan stated: The “bargain” would start with online participants taking responsibility for contributing, maybe through involved deliberative participation, maybe via quick contributions, inputting views, suggesting, commenting, endorsing, and/or voting. But the most important responsibility would be to learn what others in the community value, so a group’s proposal can be made more attractive to the broader community. The organisations responsible for administering the platform, disseminating each group’s outcomes, and attracting broad public involvement in reviewing and voting the outcomes up or down (Hartz and Sullivan, 2014).

Adam Wyner, Trevor Bench Capon, Katie Atkinson and other researchers have mentioned “crowd sourcing” to improve the quality of legislation: “Other initiatives aim to improve the quality of comments to proposed legislation. The US General Services Administration is preparing a tool to support consultation, ExpertNet, which draws “crowdsources” expertise and attempts to structure responses with social networking facilities such as ranking responses, providing specific questions for community voting, or annotating responses, among others. While this does give indicative information on respondents’ reactions, the legislation is not represented in an analytic form, much less supporting machine analysis. Rather, the content of the legislation and the reactions to it must be further analysed, though there is no analytic framework. There are additional issues raised about how to identify, certify, and monitor the community of experts”. (Wyner, Atkinson and Bench Capon, 2011). This is beyond co-regulation. Developments of digital tools allowing for this type of crowd sourcing may lead to different expectations with respect to the governments information services including support tools for case assessment and access to relevant legal information. “The community itself needs to be regarded as a form of database, unconventional in the IT sense, but wholly understandable from a social science perspective. Local people usually know their local area better than anyone else and so can reasonably be expected to provide detailed insights into local phenomena that are not normally available via ordinary Geographic Information datasets” (Carver, 2001).
The contribution of crowd input to better design of services.

Catherine Howe states that social media are worth investing by public institutions for all obvious reasons, but especially for the design of better public services: ‘But the real prize in terms of cost savings is around co-production of services: change the way in which you work with the public and enable them to look after themselves for a greater extent’ (Howe, 2011). As stated before, interesting ‘crowd legislation’ experiences have been described by Farina in her work about eRule in the United States Obama administration (Farina, 2012).

For research on access to and legitimacy of Law, it is relevant to note, that:

1. **Instant transparency and instant feedback is close to become a reality because of social media.**
2. **Internet technology is bringing the debate 24/7 into the life of the stakeholders.**
3. **If governmental agencies do not learn to channel that energy, alternative forms of governance will emerge with the potential for polarization between the ‘regular’ bureaucracy and the ‘digital’ alternative thereby creating a potential thread for the trust in and legitimacy of the government.**

In Chapter [II], I mentioned an old, but perhaps still interesting observation from Weber. ‘Man hat nur die Wahl zwischen „Bureaurkratisierung“ und „Dilettantisierung“ der Verwaltung, und das große Mittel der Ueberlegenheit der bureaucratischen Verwaltung ist: Fachwissen, dessen völlig Unentbehrlichkeit durch die moderne Technik und Oekonomik der Güterbeschaffung bedingt wird.’ Translates as: ‘One only has the choice between ‘bureaucratization’ and ‘amateurism’ of governance and the great advantage of bureaucratic governance is: ‘Craftsmanship’, which total necessity is defined by modern technology and the logistics of good supply’. (Max Weber, *Wirtschaft und gesellschaft*, 1921, p 128). Weber states that government is a more efficient owner of the bureaucracy since it has a better mastering of technologies and distribution.

The question is if the rapid development of corporate platforms that have empowered citizens to use social media at the rate we are now seeing is sign of ‘dilettantisierung’ or an indication that other sectors than public sectors are becoming so proficient in technology that it could be called ‘fachwissen’ in relation to modern technology.

This line of argumentation would lead to the conclusion that government has to master the same type of technology to support the professional level of their bureaucracy or small pockets of ‘dilettantisierung’ would arise – given its superior dealing with technology and distribution – out of its sphere of influence. In view of the fact that government bureaucracies are a required part of society, this is perhaps inefficient in the longer term.

**Conclusion for further research**

In this thesis I have explored a number of ideas regarding co-regulation in the specific context of my research, but further research questions remain to be answered. It is still an open question what would be the best balance of tasks distribution between the government and the public. An other relevant question is; Is crowd legislation a form of ‘dilettantisierung’ or a sign of maturity of our society?
11.1.6. Issue 5: Maps and law

A considerable amount of research time has been spent in this dissertation on the issue of maps as an enabling technology to support legal services. The concept of maps as a service infrastructure was not new: not as a business rule based simulation (Simcity) and not as an infrastructure (SDI, Bregt, 2004). The combination of an infrastructure for land use and ownership services and maps has been a tradition, both digital and paper (Kadastre, Ploeger, van Oosterom). The new part discussed in this dissertation could be specified as the general service to the public of clients such as business managers to extend such a map based infrastructure in more creative ways.

Some of the ideas of The Legal Atlas were adopted in the Dutch eGovernment initiative Geozet. Then it was called the “wat-mag-waar-kaart” Peters and Woudenberg, 2007).

The specific functionality of the co-creation portal has recently been adopted by the Dutch society of municipalities (VNG) in the DIMPACT initiative\textsuperscript{164}. Programme director Kees Keuzenkamp of National Public services, Ministry of interior states the following lines as argumentation for commissioning the, what they call the “thematic map application”: There are more and more geo viewers on governmental websites. Citizens get used to searching using interactive maps. Google maps and route planners are examples. These map based methods are in addition to traditional methods like searching by postal or address. The question is how to combine governmental information with a map (Keuzenkamp 2010).

In my current role as chief-architect of the joint Dutch public safety & Health districts (Veiligheidsregio’s) it is relatively easy to see the commonalities as described by Marcel Reuvers in 2004 (chapter [IV]). To extend the geo based information model with the additional layer “Safety and Security” is already happening. GI4DM (geo information for disaster management has been around for some time (Konecny, Zlatanova, et al, 2010). It does not take much imagination to extrapolate such a model for legal services in the near future. It would be interesting to investigate the common ground and the differences between these SDI’s and achieve cost reduction and efficiency in design of a legal service to citizens.

In more recent articles, authors like Johanna Nuojua have even found evidence for the opposite claim in Participative GIS research: “GIS-based solutions have been found not only to be expensive, but also to be difficult for non-experts to use. It has also been discovered that residents cannot easily make use of the data outside the structured workshop settings and traditional GIS does not support conceptual stages of planning in which mainly sketches are produced. She quotes Miller, who is even more outspoken about the lack of concrete examples of working PPGIS.” (Johanna Nuojua, 2009, Miller, 2006). Based on our research, the claim of GIS or legal mapping technology as supportive for legal servicing is likely to be limited to users that belong to a group that allows for a certain learning curve. These are usually the ones that have a need to use the system more than once. This is contrary to those who visit

\textsuperscript{164} The Themaviewer was part of DIMPACT. It was then made redundant because of http://www.ruimtelijkeplannen.nl/web-roo/roo/. I do think it lost much of its functionality, however.
a website only once. This is also supported by research carried out by the work of Nuojua in Finland, where participation for Urban Planning was made obligatory by law in 2000. ‘Since the purpose of technologies such as WMM is not to act as an occasional support for a planning project, but to become established as an integral element of municipality’s planning culture, some parts of technology maintenance should not be in the hands of a third party. This includes the moderation of discussion.’ (Nuojua, 2010).

Are maps relevant for all legal sources?

To answer this question I have investigated the use of maps in relation to law in the Netherlands in 2007. In an investigation carried out for the Dutch government I identified the specific use of maps after investigating 200 governmental websites (Boer & Peters, 2007).

The use of maps in Dutch Governmental websites in the Netherlands is shown in the figure 5 below:

**Figure 5: A classification by theme of the maps in official online publications of 200 local government websites.**

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165 The Finnish Land Use and Building Act (132/1999)
Classification of the spatial information accessible through the 200 URLs shows that the vast majority of all maps used on municipality websites were related (2007) to the representation of local regulations, and the largest number are those related to zoning or spatial plans and permits, as the figure above shows clearly. The categories “permits”, “risk”, “environment”, “business establishment” and “culture” do cover quite a wide variety of human activities, however. Zoning and, at a later stage, environment, were the first area’s of application to have a level of semantic and syntactic standardisation sophisticated enough to prove my research point. Given the usage of Google maps and similar applications, there is little reason to believe that other application area’s would not follow sooner or later. A rehearsal of the 2007 investigation would probably show this result.

In the Netherlands: beyond the usual suspects

Zoning specialists in Holland have a tendency to act in an isolated community of very highly skilled specialists. Zoning plan lawyers are a special breed in the town hall and they have to address many disputes among citizens and between citizens and government (van Zundert, 2001, P.18). The law regarding spatial planning in the Netherlands is sophisticated. In 2010 the Digital spatial plan became the legal source document and the paper document became the (non-legal source) copy. At the same time I observed the extreme applied orientation of its practitioners in the Netherlands. In Boer et al. we even argue that the spatial planning legalists have almost forgotten the notion of the reference and jurisprudence altogether! (reference Boer). As a result we received many positive feedback on the ideas presented in this thesis from the experts, but without any consequences beyond zoning plans and landownership. Statements made by the practitioners were rather placid: ‘They know about maps and laws. Others don’t. You have to live with it’. To my experience, the opposite is also true. During presentations and publications for “normal” lawyers the notion of using maps for legal representation was regarded as fascinating, but exotics (Peters, 2008). The Omgevingswet may broaden the knowledge of law and maps beyond the usual suspects. The self-contradictory fact is that although the spatial planning community seems to be driven by many legal issues, such as standardisation of maps or overregulation or “jurification” of the planning process, it does not address the relation between maps and laws as an instrument for better design or better policymaking. In my view, the current literature on SDI’s (IJSDIR, 2012 and further) and the lasting impact of the European wide INSPIRE program support the case for further applicability.

In this thesis I have described a number of solutions with maps that worked in the specific context of my research, but further research questions remain to be answered. While my research addresses some relevant aspects of integrating map with legal reasoning support, many questions remain to be answered in future research:

The investigation of usability and maps in the field of public services should continue. In retrospect I would have followed a method more in line with Gibson and preferences for affordances and less in line with the SUMI method that originated in product design. SUMI
claims to have a relation and a fundament with ISO 9241-11 about ergonomics. However, I did not find evidence of that relation, since these norms are based on an assumption that is described by usabilitynet as: ‘The phrase “when used under specified conditions” (equivalent to “context of use” in ISO 9241-11) was added by ISO to make it clear that a product should have the contextual relevant affordances, i.e. that the artifact invites the user to a specific use intended by the designer’ (http://www.usabilitynet.org/tools/r_international.htm). The SUMI focus on effectiveness, efficiency and satisfaction should become more related to Gibson’s concept of affordance, which would imply the extension of the SUMI model with concepts such as ‘intuition’ and ‘learnability’.

Usability:  ISO/IEC 9126-2 (product quality metrics, software product evaluation, (Marghescu, p.140)
Usability metrics measure the extent to which the software can be understood, learned, operated, how attractive and if the interface is compliant with usability regulations and guidelines.

Usability:  ISO/IEC 9241-11 (ergonomics, interactive information system evaluation)
the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.

Definitions of usability seem to evolve from product evaluation towards what is called ‘quality of use’ and interactivity with information systems. There is also a distinction between evaluation to determine requirements and evaluation of a finished product (Marghescu, 2009)

My current research and practice under the extreme conditions of emergency management supports the qualities of digital maps beyond any doubt (Zlatanova and Peters, 2012), but the challenge of scientific substantiation of the exact mechanisms that create those qualities or affordances remains intriguing.

Further research should also investigate other application areas where digital maps for public services could have added value. Suitability in those domains should also include empirical tests that are vital to such investigations.

11.1.7. Issue 6: Legal Infrastructures and Interoperability

The provision of knowability, legal planning facilities and co-regulation may be necessary in order to increase legitimacy, it is also very costly. In order for politicians and ranking government administrators to invest in legal services, more research in infrastructures, interoperability and standardisation is required. Victor de Pous provides an overview on the “right to interoperability” (Forum standardisatie, 2009). They all refer to the European perspectives about technology, organisation or legal framework. There seems to be little material that bridges the well-defined ideas of intrinsic legitimacy as described by founders of the European Union (Pescatore, see chapter [VII]) and operational criteria on that notion, like those that apply on co-regulation or eParticipation. In the same 350-
page essay on interoperability, Poelmans came very close to bridging the gap. He states that interoperability is key and services should be measured by user satisfaction survey’s to ensure an orientation from the citizen’s perspective rather than the government perspective. Unfortunately, He does not provide metrics for participation or service delivery infrastructures. “Chain service delivery is the road to citizen satisfaction. So the real option is to design modular solutions which can be combined and connected according to the needs of the customer. Common solutions based on standards are needed. Interoperability is both necessary and helpful. Without it, there is no e-government in the real sense of the word” (Poelmans, Eerlijk zullen we alles delen, Forum standaardisatie, p 117). There are many legalistic or technical approaches towards interoperability within a service infrastructure. ‘Jeff Rothenberg was, among others, invited by the Dutch National interoperability board (Forum standaardisatie) to give some relevant clues on the costs and benefits of interoperability questions. He and his colleagues’ provide useful insights, gradually concentrating on the question of semantic interoperability and the notion of reusability of components for different sectors when building a joint infrastructure and applying service oriented architectures’ (Rothenberg, 2009, in eerlijk zullen we alles delen, P 349). A stable legal service infrastructure is required. This forum and a number of other initiatives (for example CEN/Metalex and a range of eGovernment en eParticipation projects of the European Commission) have contributed to standardisation and other means for interoperability. Still further research is required, especially to provide an overview of criteria that legal service infrastructure have to comply to. One can even imagine requirements for ‘Open law’ or ‘Open linked Law’ as a mechanism for interoperability based on the W3C principles of semantic web.

In this thesis I have described some infrastructural and interoperability enhancing solutions that worked in the specific context of my research, but further research questions remain to be answered. Amongst them are questions related to:

- The investments, costs and benefits of a legal service infrastructure.
- Maintenance and governance issues.
- Content management issues.
- Translation of sustainability (‘Duurzaamheid’ in Dutch), recycling, vital and other contemporary holistic labels into architecture and infrastructure concepts that illustrate the need for lasting information distribution mechanisms.

11.1.8. Issue 7: The Digital Bureaucrat and Law

Translation of policy norms into digital norms: the role of the digital bureaucrat

The experiments during the research raised a number of questions regarding the position of the legal system designer. The scenario’s and business rules in the system were subject to interpretation. The “categorisation of use cases” and the correspondent “go” or “no-go” jurisdictions (area’s on a map) represented by colours on a map required knowledge and
implied simplification of reality during the design stage. The design involving conflicting and non-conflicting use case scenarios were again subject to interpretation. As stated in Chapter [VIII], this is mentioned so eloquently by Van den Hoogen in his principles for fair electronic trial (van der Hoogen, 2007) and by Bovens and Zouridis (2002). ‘The system designers, legal policy staff and IT experts are to be regarded in particular as the new equivalents to the former street-level bureaucrats’. Van den Hoogen has a similar recommendation for judges at the end of the pipeline in the court situation. He also puts emphasis on the design phase of ICT-based legal and administrative systems that automate some of the decision making process steps. Van den Hoogen suggests in the explanation of the impact his ‘principle 14’ of ‘fair electronic trial’: The judge’s work is partly replaced in its execution, but his role has not ended. He should be involved in the design of the system and education of judges should incorporate much more knowledge about ICT (Van der Hoogen, 2007, p 142).

In my research I found that the transparency involved with digitalisation of the legal playing field puts a new light on the issues that Lipsky’s street level bureaucrats have to deal with. I met many different civil servants, who perform the painstakingly meticulous job of translating broad policies in concrete do’s and don’ts. These experts were very aware of the risks they take as their interpretations will have an effect on potentially a large number of case. The risk of being challenged for taking a wrong interpretation is also increased by transparency that comes from putting all those micro decisions on the internet. The street level bureaucrat is replaced by ‘the digital bureaucrat’ or the ‘system bureaucrat’: the one who designs the decision models for computerized systems that do decide about prohibits and allowances of citizens.

The civil servants I met during my research sincerely tried to justify their interpretation and were making efforts to organize critical reflection on their design decisions.

It is however almost frightening to see how small the number of government officers actually is, that are able to contribute to those design decisions in during the building process of digital government services. In typical eGovernment development projects we see few system designers that take the trouble and have the knowledge needed for this complex task. The problem is worsened by the current trend of outsourcing systems design to consortia that often lack the capacity nor have the authority to operationalise policies into system design. Unfortunately sourcing decisions often come from the governments’ ICT departments that do not always seem to be concerned about the consequences of outsourcing their knowledge to consultants and SAAS (software as a service) suppliers, sometimes stating that their demands are made explicit in service level agreements and provide sufficient control over the product.

All in all the role of the system bureaucrat has become much more influential in this digital era. It is still an open issue how we should organize the democratic control over the design decision made and consequently how we can guarantee legitimacy of the system being designed.

This controllability is further hindered by the phenomenon that the legal service delivery platforms are designed and build by large procurement coalitions, and the coalitions may
vary from service to service. The collaboration between local municipalities is frequently seen as useful, as it will allow sharing the investments, but it may also be an obstacle in clarifying who should check the legitimacy of the design. The influence of the council members on the service levels provided by the city seems decreasing because of reasons of complexity, institutionalization and scale. Without such democratic control, the role of the digital bureaucrat that designs the systems or decides about the supplier delivering the design seems even more important. I conclude here, that technology creates new levels of subjectivity at design stage of policy making. Only specialists can detect non-conformance with the original intentions. Any legal service infrastructure should therefore be subject to measures of transparency at the design stage in order to be supportive for legitimacy. I will provide a number of concrete findings and recommendations later in this chapter.

Further research should address a whole range of issues concerning the new position of the system bureaucrat, such as:

- **The required knowledge and skill set of the system bureaucrat as interpreter of the legal and policy intentions of the responsible democratic government and maker of crucial design decisions.**
- **The tension between specific interests coming from personal relationships between systems designers, including policy makers, suppliers, workers in enforcement agencies and individual citizens and the general interests of the citizen.**
- **How can we balance conflicting interests between being transparent for which we have to share (digital) information and the need for non-disclosure in order to come to swift decisions quickly?**
- **Dilemmas of translation and interpretation that need explicitation in relation to transparency and accountability.**
- **The effects of mechanisms for procurement and outsourcing on conformance of the solution with policy intentions and intentions of the legislator.**

Some of these issues are discussed among civil servants. These discussions address the role of consultancy agencies, especially those in the field of Spatial planning law (Plan bureau’s). In this domain private companies gradually achieved a very strong influence, partly because of the lack of knowledge among civil servants about the technology required to comply with new National rules for digital spatial plans. This need for different knowledge and skill sets of civil servants unfortunately seems not to be the focus of current Dutch eGovernment practice.

Over the last five years a number of successful Dutch eGovernment programs became subject to budget cuts and short term gain. Building on top of the experience with the digitalization of the tax administration, the Student allowance administration, OL2000 and a number of other large ICT initiatives in the early years of 2000, the ICTU agency has launched a range of eGovernment programs. An example of such eGovernment programme was the i-NUP program aimed at making investments in base registries for addresses, topography and citizens, thereby enabling maintainable location-based services. The i-NUP program
is now closed down, while most experts regard this infrastructure as ‘only just begun to manifest itself’ (van der Laan, 2014, Geurts, 2014). The Indigo program run by the Dutch Immigration and Nationalization Service (IND) and the Legis program run by the Ministry of Justice, followed with yet another layer of knowledge about service delivery and complexity of design. While the Indigo programme resulted in a new support system for the IND the Legis programme that aimed at harvesting from the Indigo programme generalizing its results and better connecting legislation with the operational execution thereof, was stopped without being able to produce any substantial results. The DURP program mentioned in Chapter [III] and the INSPIRE program at the European level have developed into the first digital legal infrastructures in the world. Unfortunately, many of the follow up projects are now regarded as ‘failed ICT projects’ and the knowledge that came with them has almost vaporized. It is a trend gradually growing in popularity to blame government and ICT as part of a general antipathy towards government actions. The arguments seem to be related often to implementation costs. Implementation problems and ICT problems are often related, but they are not the same thing. As a consequence, politicians have become cautious about anything to do with ICT. Cutting ICT budgets has become an illustration of ‘efficiency’ and in recent days the Dutch municipalities have become responsible for many more government services in what is called ‘the great decentralization effort’. A frequently used political argument for that decentralization efforts is the claim that this would bring services closer to the citizen. Both arguments fail to address the need for recognition of system level design challenges and for substantial investments in improved legitimacy.

In Chapter [II], I mentioned the 34 recommendations of the special committee Elias about failing ICT projects, that seem to lean towards more control and more control measures, while the findings of its own research agency mentioned inadequately organized design processes. (Tweede kamer, Eindrapport, p.22, 2014). One may doubt that more control will solve these design problems. My findings point towards more engagement with the technology, more iteration with users during that design process and perhaps less fixation with a pre-determined solution.

Some of the successful design elements that were part of the technology used in this research were:

- Modular design.
- Content separate from software.
- Use of technology that could be swapped for newer technology.
- Open Service oriented architecture.
- Maintainability of content based on content standards.
- Mixed public and private platforms
- Users understanding the consequences of design decisions.

See also Dutch Parliamentary reports that gave munition for stories about huge government spills, while in fact much of the failure could be related to the fact that too low cost estimates and too short project times were seen as a mechanism to get the investment sanctioned by management (C. Verhoef, 2014).
The collaborative design approach we took in the living lab was based upon quite different ideas on controllability than what seems to be the dominant conceptualization within the current discussions about ICT in the political realm. The investments needed for this different approach and their benefits in terms of costs were out of scope of my current research. The experts involved in the living lab shared the conviction that spending more time at design time in order to prevent costs at execution time later. Further research may show what the budgetary effects would be if the approach would find broader application. One may question the assumptions behind the traditional costs/gain estimation methods given that the available technology is now changing faster than project plans can be written, approved, financed, governed and evaluated.

11.1.9. Research Issue 8: Computer says ‘Go!’: The Legal profession and technology

In 2008, I presented the results of experiment [I] to the Dutch association of law and ICT (Nederlandse vereniging voor Informatietechnologie en Recht, NIVvIR). The confrontation was both gratifying and shocking. It was gratifying because the audience was impressed and fascinated by the possibility to use digital maps as a legal instrument in itself rather than as a topic for a legal fight over copyright. It was shocking in the sense that even this audience of legal professionals specialising in ICT technologies did not see the need for some serious further exploration. It was regarded as a nice exotic feature or gimmick, but the reality was paper texts, of course (Peters, 2008). The distance between ICT technology and practitioners of Law is frightening and it does not seem to decrease if one regards the curricula of the Dutch Schools of Law. Most Dutch law schools seem to ignore the potential impact of technology on the tasks that are part of their profession and could be automated in the near future.

Brynjolfsson wrote a book called ‘second age’, that we are facing an age of creative destruction, where ‘technological progress is going to leave behind some people, perhaps even a lot of people, as it races ahead.’ Tom Meltzer takes this line of argument and that of another futurist, Richard Susskind, to argue that the lawyer can be described as an endangered species in his article ‘Computer says go’ in The Guardian (Meltzer, The guardian, 2014). He quotes Susskind mentioning new jobs as ‘legal knowledge engineers, legal technologists’, legal project manager, risk manager, ‘process analyst’ and the fact that current lawyers think they did not went to law school for such jobs. Meltzer ends his article with the ‘transformed legal service companies’ like ‘Rocket Laywer’. It does not take much imagination to envision the need for a revolution in Law Schools, a revolution especially geared for the training of the legal technologists.

167 http://www.law.leidenuniv.nl/onderwijs/onderwijsaanbod+bachelor/onderwijsaanbod.html
168 https://www.rocketlawyer.com/
The research field of Artificial Intelligence and Law has been around for a while (van Engers, 2012) and the JURIX conference celebrated its 25th anniversary, but these researchers were often regarded as ‘fremdkörper’ among their legal colleagues. The field is now spreading outside the ranks of the usual suspects, however. Jeremy Pitt is given space in the most influential internet magazine in the world when he calls ‘Computational justice’ more than arcane art (Pitt, Wired, July 2014).

The leader of the Luddites in Nottinghamshire, spreading out and burning Textile factories to protect the workers, but also later to become the symbol of the fear for technological development, 1811.
The condemnation of digital technology supporting government from either a remote intellectual position or a victimized (losing your job) position could perhaps - in part - be rooted in the Luddite reactional tendency, that - at least during the last four centuries – always accompanied technical evolutions. People tend to fear the change to long standing traditions brought on by technology. They seem to prefer to fight it rather than adopt it - until it is too late. Such a ‘revolution’ occurred during my research with the role of the ‘Notaries’. This once lofty and well paid profession of writing formal documents, that started having its role under the Roman Emperors, was brought to a sudden standstill when that role, or at least the profitable part of it, was replaced by a website from the Cadastre. A similar resistance against technology – induced change can be found in the discussion about UBER, the online taxi-service. The recently appointed Digi Commissioner in The Netherlands made an interesting remark. He stated that a lot of influential decision makers object to modernization because of the ‘non able-digibureaucratical’ citizens. His reply was that his greater worry were the number of non able digibureaucratical government officers (Ambitie digicommissaris, Eenhoorn, 2015). A president of one of the Dutch Courts, Christa Wiertz, states: [...] One observes that whole sectors are under pressure or become extinct even, because of the innovations. Airbnb is the harbinger of terror for the Hotel business, for example. The Taxi business is under threat from Uber. Shops are having a hard time because of internet shopping. Post offices have disappeared. I can continue and it will not stop at the private sector. Being the body of judiciary, we have an important task to guard a fair Society. The question is how we are going to guarantee the Rule of Law in 2050? [...] (Wiertz, 2016)

Conclusion for further research

In this thesis I have encountered a gap between the existing knowledge about technology among the legal profession and the knowledge that is required at this time. Further research about relevant skills and future changes in the tasks that belong to the profession is necessary.


In Chapter [I], I described the implicit contract between citizens and government as an unspoken covenant that can be violated; ‘the fabric of commitment from citizens to government to obey laws, follow rules and stay civilised. This commitment seems at least partly dependent on a unspoken covenant that government in return tries to act reasonable, sets out the rules in understandable ways and makes balanced decisions that make sense’. This contract was reframed in accordance with the ideas on ‘Le Contrat Social’ of Jean Jacques Rousseau. I also described some types of alienation, such as those caused by unreasonable directives (LPG station relocation), the lack of transparency about fairness of the balancing of interests and the impression that the computer has made decisions all by itself. Grimmelikhuijsen has tried to investigate the link between transparency and trust
in government (Grimmelikhuijsen, 2012.) This attempt shows that the relation between trust and transparency is not easy to isolate. Some of the results in my research indicate a relation between personalisation and alienation. If people feel treated as an individual by the bureaucracy they might feel less alienated when the (computerised) system in the administrative bureaucracy does not behave according to their expectations. According to my research, improved usability and affordances could support co-creation. It is interesting to investigate if improved usability and well-designed affordances could decrease alienation. The fact of the matter is that we ‘will talk more to machines and less to people’, states van Ammelrooy, while describing the experiences of people trying to get rid of the overload of push mails sent by LinkedIn.' (van Ammelrooy, 2015).

Future research should therefore perhaps concentrate less on the efficiency and cost paradigms of effective government services and more on the design factors that contribute to the personalization of service treatment\textsuperscript{170}.

This seems the route that is followed by private business in the digitalized world and government could learn from those developments. The dimensions as depicted in figure 7 about personalized and impersonalized services are an attempt at modelling some of those factors in the context of legitimacy, alienation and technology.

Figure 7: Legitimacy and the relationship between technology and increase or decrease of alienation.

\textsuperscript{170} Some Dutch initiatives were directed to the idea of ‘my government page based on DigiD and there is a body of literature on ‘life events’ based services.
For the citizen yet another issue may cause alienation. More and more complaints of citizens are processed by means of IT solutions, varying from automated call-center applications to web services offering FAQs, WEB-forms and automated dialogues. It may drive the citizen to madness when he is directed to an electronic help desk for services and questions or complaints about those services.

There is a need for further research about appropriate modelling and how these forms of alienation can be addressed in the design stage. Questions that should be addressed in future research are amongst others:

- Could alienation be diminished by technology by providing better explanation of interest balancing and regulations?
- Would it be possible to show that others have taken your interests into consideration, even when they decided against them?
- Would it be possible to show that government officers have taken your interests into consideration, even when they advise against them?
- What type of support is required next to a good explanation of the arguments and reasoning used to avoid the alienating experience of ‘computer says no’?
- What transparency of services and which design of legal services would decrease alienation?

A concrete case for future research would be to study the impact of the ‘consolidated clarifying texts’ (‘toelichting’ in Dutch) as part of the Omgevingswet programme. Based upon the findings of the research described in this this I would claim that adding the consolidated text to the map based querying on the omgevingswet service portal (this portal is now called AIM which is being tendered at the moment and foreseen to go life in 2016) would lead to less alienation among users and government officials than if such a service would be left out. This could easily be turned into a testable hypothesis. Unfortunately such text to map facility is not planned yet.

### 11.2. Recommendations for government

The findings of experiment [III] have led to a number of follow-up interviews and workshops\(^{171}\) that were mostly related to further design and translation issues regarding policies, norms and representation to the public. The findings could be seen as a more detailed set of requirements and needs for measurements in follow-up of Bovens and Hoogendorp en Grimmelijkhuijsen (2002, 2007, 2012).

I will provide a number of recommendations for digitalization of legal services. One should realise the significance of the difference between civil servants who know each other working in the same building from those who only see a website on a screen with a permit

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\(^{171}\) Organised by Province of Flevoland, IPO (interprovincial umbrella organization)
request or an inspection report of an incident. In the latter case there is no informal base for coordination or adjustments, no records unless they are attached to the on-line dossier and no check on pluriformity or multi sector policies.

At explorative workshops organised by the Dutch Ministry of Infrastructure and Environment and all Dutch Regional Authorities in Flevoland in 2012, a number of information requirements were discussed to deal with the consequences of complete digitalisation of the legal processes concerning physical planning, spatial regulations and enforcement. Many of these requirements are also input for the new Dutch Omgevingswet which initial drafts were created in 2015.

The following aspects that were raised from this exploration need further exploration and development:

- Standardisation of legal hierarchy ranking; which regulation is overruled by other legislation.
- Intentions of legislator made more explicit to the public.
- Integration and implementation of different policy aspects (e.g., economic, environmental, infrastructure).
- Design of regulations based on digital principles regarding maintenance, workflow and metadata, rather than paper principles.
- Versioning, recording and temporal aspects should be included in designs.
- Practicing with new forms of co-creation.
- Technical system transparency, especially regarding design and implicit inner workings.
- Semantic transparency, consistent use of terminology and its meaning.
- Law seen as a service infrastructure.
- Make the evaluation matrix clear before deciding on new operational policies and avoid a debate on the evaluation metrics afterwards.

I will now address each issue in more detail.

### 11.2.1. Recommendations for digital law

**Ad 1: Consistency and ranking**

In digital systems the need for explicit ranking of legal regimes is important. That knowledge about pluriform regimes, different legal sources and prioritization of policies (lex superior/lex inferior) used to be the privilege and the discretionary jurisdiction of government official, but that knowledge has to made transparent when digital systems are to be used to implement them.

Clear insight in the ranking of different jurisdictions is relevant for government and its clients, since many layers interact and affect the same object or location. The listing of spatial ruling types that can affect a certain case in the figure below is Dutch law, but
independent from the language or country it is a clear illustration of the need for civil servants working for Regional and Local authorities to agree on the ranking of different levels of rulings before these are digitalized and opened for public. Otherwise there is no consistent manner for legal interpretation and case assessment.

Figure 4: Dutch overview of Spatial rulings. The listing is also a hierarchical order, indicating which regulation prevails over what other ruling.

<table>
<thead>
<tr>
<th>Dutch ruling</th>
<th>English translation (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voorbereidingsbesluit</td>
<td>Preparative ruling</td>
</tr>
<tr>
<td>Ontwerp bestemmingsplan / inpassingsplan</td>
<td>conceptual spatial plan/alignment plan</td>
</tr>
<tr>
<td>Rechtstreekse regels AMvB Ruimte / Barro</td>
<td>direct ruling: General Spatial ruling/ environmental law</td>
</tr>
<tr>
<td>Rechtstreekse regels provinciale Wroverordening</td>
<td>direct ruling: Provincial ruling</td>
</tr>
<tr>
<td>Reactieve aanwijzing</td>
<td>responsive directive</td>
</tr>
<tr>
<td>Omgevingsvergunning in afwijking van het bestemmingsplan</td>
<td>environmental permit diviating from Spatial plan</td>
</tr>
<tr>
<td>buitenplanse ontheffing projectbesluit</td>
<td>Exception To the Spatial plan/project ruling</td>
</tr>
<tr>
<td>Uitwerkingsplan</td>
<td>executionary detail plan</td>
</tr>
<tr>
<td>Wijzijingsplan</td>
<td>deviation plan</td>
</tr>
<tr>
<td>Partiele herziening bestemmingsplan</td>
<td>Partial revisioning plan</td>
</tr>
<tr>
<td>Rijks inpassingsplan</td>
<td>National alignment plan</td>
</tr>
<tr>
<td>Provinciaal inpassingsplan</td>
<td>Regional alignment plan</td>
</tr>
<tr>
<td>Bestemmingsplan</td>
<td>Spatial plan</td>
</tr>
<tr>
<td>Beheersverordening</td>
<td>governance ruling</td>
</tr>
<tr>
<td>Instructieregels AMvB</td>
<td>instruction directives General ruling</td>
</tr>
<tr>
<td>Ruimte / Barro</td>
<td>Spatial environmental plan</td>
</tr>
<tr>
<td>Proactieve aanwijzing Rijk</td>
<td>National Preemptive directive</td>
</tr>
<tr>
<td>Proactieve aanwijzing Provincie</td>
<td>Regional preemptive directive</td>
</tr>
<tr>
<td>Structuurvisie Rijk</td>
<td>National Structural plan</td>
</tr>
<tr>
<td>Structuurvisie Provincie</td>
<td>Regional structural plan</td>
</tr>
<tr>
<td>Structuurvisie Gemeente</td>
<td>Local structural plan</td>
</tr>
</tbody>
</table>

The listing of all the legal source terms above shows the pluriform legal environment that has to be taken into account when designing a digital version. In 2015, the notion of ‘instructions’ has been added to the arsenal of terms.
Ad 2) Intentions made explicit

It turned out to be very hard for civil servants in diverse agencies of government to understand and apply the correct interpretation of a rule for a given case, if the once intended purpose of a regulation in the context of a policy was not ‘attached’ to a regulation in the design stage. The legal assessment process in a digital environment is distributed over many government agencies and the knowledge that is needed to understand the original context won’t be available at all those government locations anymore, without explicit texts about the intention. Some even recommend the explicit consolidation of the ‘intention text’ (‘toelichting’) as part of the legislative process in the new omgevingswet (Jolanka Perk, Provero 2015)

Ad 3) Integration of different policy aspects

The focus on fast legal processing of permits was endangering the need for integrated approach were many aspects of the environment had to be considered. The process and workflow minded and therefore more text-oriented actors in the spatial planning arena are seen as the advocates of speed to support the notion of ‘client centered service’ orientation, while the opposite can be true from the geographic field-perspective. Bottom – up actors in the field perceive a multi-sector approach as a necessity for consistent policy making which often requires more time to process permits, but this may safe costly procedures afterwards. This is in line with my findings about the NGO-representatives who seek to avoid fragmented policy-effects of regulations on a certain geographic area. It is also in line with the findings of authors like Bovens, Zouridis and Hoogwout (2002, 2010), who warned for an over emphasizing of the cost- and efficiency paradigm for government. During the last three years debating about DAO, the Digital Agenda Omgevingsvergunning or Digital agenda environmental permit processes) , it became clear that a single domain oriented perspective on the administrative process can be a danger for a well-balanced integrated legal service. The risk of a fragmented approach reasserts itself, when one defines client centeredness and user-friendliness as an improved (defined as fast) workflow management problem. The sole focus on speedy permit process management generates the risk that spatial planning is fragmented, divided in separate sectoral views and lacks the information required for adequate servicing by the government officials that have to provide specialist knowledge. The irony is that the term ‘omgevingsvergunning’ suggests an integral view. This integral intent is often meant – again- from a workflow management efficiency perspective and not from a policy effect perspective, however.

In Dutch this is often called ‘zaakgericht werken’, whereas the ‘omgevingsvergunning’ or ‘environmental permit’ suggests an integral approach.
Ad4) Paper Protocol transformation towards digital

The professionals indicated problems with National protocol requirements that were based on paper provisioning principles of law. These protocol requirements gave unnecessary and sometimes absurd side effects. They were experiencing problems with explaining the situation to ‘old fashioned paper legislators in The Hague’. As an example they mention the notion of ‘putting every relevant rule in one overall directive to maintain overview’. The one-rule-for-everything paradigm is irrelevant given that a digital system can provide such overview immediately.

Ad 5) Version control, the temporal dimension and recording (mission impossible?)

Major legal conflicts can arise from timing issues regarding permits and regulations. Examples are:

- ‘Buitenplanse ontheffing’ (exception on consolidated spatial plan)
- ‘Voorlopige voorziening’ (temporary provision)
- ‘Partiele herziening’ (partial reconsideration)
- ‘Reactieve aanwijzing’ (reactive directive)
- ‘Definitieve herziening’ (preparation, design, final consolidated revision)

Each term indicates some kind of versioning that affects the permit in that locality. If these version stages are not meticulously translated into the digital designs, the court case is lost due to conflicting regulations. Many business manager decisions are affected by the temporal aspect of regulations and its consequences for risks and return on investments. The resulting complexity will lead to unnecessary confusion, court cases and difficulties to implement policies. Some professionals advise to abolish versioning altogether and use only the latest consolidated digital versions open for public. This notion of perpetual plans as a living document became a common understanding during the discussions about the Dutch ‘Omgevingswet’ in 2015. It also strengthens the need for a maintainable legal infrastructure where text and maps are intertwined. As cases can be disputed years after the decision about a case was made, one should be able to reconstruct the entire set of rules that was applied at the time of the decision! Unfortunately the current infrastructure doesn’t support this and the importance of this issue is till insufficiently recognized by the policy-makers. Slightly better is the awareness that we should create a similar mechanism for the data.

The Legal design document for the Omgevingswet contains the following paragraph:
“Audit trail: Over het leveren van gegevens via de Laaninfrastructuur voor formele processen, zoals het indienen van aanvragen en het informeren over de voortgang hiervan, moet mogelijk op een later tijdstip verantwoording worden afgelegd. Daarom is het van belang om metadata over alle informatie-uitwisselingen vast te leggen in een audit trail”. Transl: Audit Trail: “There will
probably be a moment in the future, where the government will have to provide justification for the information, such as request and the progress data about those requests, that has been delivered through the digital infrastructure. Therefore it is necessary to maintain a record of all metadata about all information exchanges in an audit trail.” (Ministerie I&M, Programmadirectie eenvoudig beter, 2015).

This statement about design requirements is very true and – it has to be said – a recipe for disaster. The problem is that most literature shows, that semantic interoperability is probably the best interconnectivity mechanism for all those layers of spatially related data (See Journal of Spatial data infrastructures 2012 and further). This mechanism is capable of handling retrieval services. It is not capable of handling complex workflows or transactions. If the intention of the designers is to provide a legally water tight workflow metadata system that serves the multidisciplinary, multi government layer and multi sector aspects that should be covered over a given time period, than the current ideas on how to support this with an infrastructural solution are likely to fail, as they deny the inherent complexity of the solution.

Figure 5: Illustration on the cover of the report: ‘Laan van de leefomgeving’; the analogy of road infrastructure used for the digital service infrastructure in Dutch Spatial affairs (Ministry I&M, 2014). The text is Dutch, but simply lists sectoral clearinghouses such as water, nature, air, physical safety, sound, space, soil, build, cultural heritage and so on, that work on one coherent information exchange and processing infrastructure.

Combining workflow government process control paradigms with webservice based multi-source retrieval paradigms is combining two dimensions having their own intrinsic
complexity. The current maturity of IT in governments only allows the automation of processes that handle a massive number of cases with a relatively small variety between those cases. It makes sense to separate infrastructures for transaction processing from infrastructures that should inform a user about the legal consequences of a complex case.

PBLQ provides an interesting view on the digitalisation of the Dutch omgevingswet and provides a number of recommendations:

There seem to be two conflicting drivers for this omgevingswet: fast request processing for the citizen and sectoral integration over segments of government. The utopian ideal of ‘one stop shop government’ in view of the citizen may be feasible for one process or for one retrieval request, but not for all processes and all possible retrieval requests.
Ook is het kwetsbaar, op twee verschillende manieren het zelfde te laten registreren. Zo lang papier en digitaal beide aan de orde zijn – en dat kan lang het geval zijn – behoort tussen beide een rangorde te bestaan: welke prevaleert bij gebleken verschillen?

Het komt vaker voor dat bestaande registraties van objecten worden samengevoegd. Denkbaar is het bv. om de informatie die nu in de wegenlegger is vervat, op te nemen in het omgevingsplan.

Ook is integratie in één systeem vaak niet nodig om zaken met elkaar in verband te brengen. In veel gevallen is het steken van een digitale breinaald door verschillende systemen voldoende om het beoogde inzicht te verkrijgen.

I niet in één keer alles ultiem geregeld hebben, immers al tijdens het ontwerp en de bouw wijzigt de wereld.

Translation:
Lessons learned based on earlier experiences with digitalisation processes regarding the living environment or outside that domain, are of great importance while making judgements about the omgevingswet. The intentions that are consolidated in law do not automatically lead to feasible services or policy targets. This is also relevant for the omgevingswet, because the digitalisation of the environmental (this term is addressing the entire societal living environment) legal domain is a considerable operation.

Would it be possible that the entire physical reality, in all it nuances, colour and variety and all exceptions to the rules could be captured into a digital reality?? Are all societal considerations of politicians, that are required to shape that physical reality, translatable in zero’s and noughts?? Probably not, but that is – in our opinion – also not necessary. What is necessary, that, in order to align the world of policy makers and information experts to serve both the layman and the legal expert, is the correct digital representation of the legal reality and the digital support of policy making and implementation processes. Given our extensive experience with the digitalisation of policy making processes, we think that the omgevingswet is more than worth the trouble of that challenge. The lessons learned earlier, indicate that the digitalisation is indeed necessary to provide adaptable services that cater for different user needs. The goals of the omgevingswet even imply that a nation-wide administrative digital infrastructure is in existence.

Some of the lessons learned by administrations are the following:
- Digital legislation is more adaptable and flexible and this is required in a rapidly changing environment.
- Objects should be stored once and used in different processes, but one should not connect everything with everything.
- Semantics are essential; people will use different terms to indicate the same thing and system should be able to handle such variety.
- Digitalisation supports the integration of dossiers from different sectors.
- Interoperability between systems is not always required when there are other
retrieval techniques made available that provide the link between two connected items.

There is no perfect static IT design, there is only incremental learning.

(ina 9 / 47 Digitaliseringstoets Omgevingswet, PBLQ, 2013)

The document ‘Digitaliseringstoets’ also provided an interesting list of items where digitalisation could be assisting many aspects of the legislative process:

Vanuit het uitgangspunt dat een stelsel van digitale voorzieningen een belangrijk instrument is om de doelen van de stelselherziening dichterbij te brengen, is de wet getoetst op de momenten in de beleids- en uitvoeringscyclus waarop digitalisering van nut zou moeten zijn. Hiermee is inzicht te verkrijgen in mogelijke witte vlekken of gemiste kansen in het stelsel van de wet. In principe gaat dit om alle momenten waarbij er sprake is van informatie-uitwisseling tussen de actoren (overheden, burgers, bedrijven) in het omgevingsrecht.

Deze momenten zijn:

1. De vorming van generiek beleid zoals omgevingsplannen en programma’s: hierbij is sprake van informatie-uitwisseling en meningsvorming tussen overheden en betrokkenen in de samenleving. De digitaliseringsmogelijkheden, die hierbij aan de orde kunnen zijn, worden vaak samengevat onder het begrip e-Participatie.
2. Het vaststellen van het beleid.
3. De verkondiging van het vastgestelde beleid.
4. De oriëntatie van initiatiefnemers in de ruimtelijke omgeving. Hierbij gaat het om meer dan alleen de vraag hoe makkelijk een initiatiefnemer zicht krijgt op de ruimtelijke voorschriften waaraan hij zich dient te houden (dit zou eventueel ook onder het vorige punt kunnen worden gevat). De digitalisering kan de met de wet beoogde uitnodigingsplanologie beter mogelijk te maken door de initiatiefnemers te helpen zoeken waar hun initiatieven eventueel nog mogelijk zouden kunnen zijn (de zogenaamde wat-mag-nog-waar kaarten).
5. Het indienen van eventuele vergunningaanvragen en meldingen.
6. Het bekendmaken van ingediende aanvragen en voorgenomen initiatieven aan derden/ belanghebbenden.
8. De communicatie tussen overheid en initiatiefnemers over hun aanvraag-/meldingsprocedure.
11. Het toezicht houden op de uitvoering van de initiatieven conform de wettelijke en vergunningsvoorwaarden.
12. De rechtsbescherming van initiatiefnemers en derden.
13. Het monitoren van het beleid en de mate waarin omgevingsnormen en -doelstellingen worden gehaald.
15. Het interbestuurlijke toezicht op de uitvoering van de wet.

Translation:
Based on the assumption that a framework for digital services is seen as an important means to achieve the goals, we have examined the new law especially for those occasions during stages in policy making and the implementation of policies where further digitalisation may be of help. This will generate insights in where opportunities could be found in the legal framework. In principle this is applicable for all moments of information exchange between actors (such as governments, citizens and businesses) in the omgevingswet.

These moments are:

1. The creation of general policies, such as spatial plans and programmes. In these cases actors exchange information and take position. The opportunities for digitalisation are often called ‘eParticipation’.
2. The consolidation of policies.
3. The explanation of policies.
4. The orientation of those who take initiative in spatial planning. This is more than the stakeholder being aware of the legal sources that control his or her possibilities. The digitalisation can better support the intentions of this Law as ‘invitation planning’ by actively helping those initiators to find the locations where the initiatives would be possible according to law (the so called ‘what is allowed where map’).
5. The submission of a permit request.
6. The publication of all permit requests submitted and the initiatives that are foreseen.
7. The reduction of administrative burden of the initiators by helping with all research obligations. The Dutch State Council has made an explicit request to the legislator to see to it that such a support is being implemented.
8. The communication between government and citizens about permit requests and obligations.
9. The alignment between government agencies during the processing of permit processes.
10. The publication of permits that were permitted and their contents.
11. The enforcement of norms regarding the permits.
12. The legal protection of initiators and third parties.
13. The monitoring of policies and the measurement of the goals of those policies.
15. The administrative supervision on the execution of the law.

(Uit: Digitaliserinstoets omgevingswet, Ministry of Housing, Spatial affairs and infrastructure, Beetsma, Hoogwout, PBLQ, 2013)
Ad 6) Co-creation requires practice, Le Contrat Social requires renewal

The notion of ‘engagement’ with technology as suggested by Verbeek (2010) requires practicing. Experience with new balancing activities with more responsibility delegated to citizens and businesses does not develop overnight. The alternative for the current government administrations’ practices - with trial and error – is that parallel digital bureaucracies will develop, including those regarding legal information services. This is undesirable for society in the end, since a government bureaucracy is always required. Such modernized government should continue with experiments on co-regulation which would help to transfer more responsibility for interest balancing towards the local community themselves. Such co-regulation way of defining issues and deciding on an adequate policy may seem more costly given the amount of time invested in the design phase by the stakeholders, but one could argue that this is earned back from a ‘total cost of ownership perspective’. But the political reality is that support for such co-regulation approach is often lacking and the society and the politicians representing it are often too impatient to take the risk.

The question for policy makers is where to begin a co-regulation process. My research provides evidence that co-regulation could work in large, high impact Nimby situations, where people have time to get themselves organized in ad-hoc NGO’s.

It is also plausible to assume, that – once the digital infrastructure is in place – communities can handle their own local interest balancing affairs, as long as the balancing process comes with the financial responsibilities, rights and obligations. This is different from the usual eVoting or referenda processes, where the authority remains in charge. Engagement and the resulting (technology enabled) improved legal design would improve when the local community feels responsible and government would step back towards the role of process and quality manager.

The midlevel processes that are of lesser complexity because fewer stakeholders are affected or the legal complexity is relatively low may be harder to organize in a co-regulation fashion, since the complexity thereof may still require quite some professional involvement, but the available budgets are relatively small. It may also be harder to engage stakeholder to make the required investment in time when the issue is beyond direct personal interest. The engagement in a co-regulation approach would also require the stakeholders to get familiar with a new way of coming to a solution. A National infrastructure – such as intended by the omgevingsvergunning - could help to overcome a learning curve for every new co-regulation project, because citizens would encounter the same technology more than once. This co-design is part of the intention of this new law, but few actions have been taken thus far to involve actors beyond the usual suspects. This indicates that the possibilities of the new technology for involvement and co-regulation should also be explained to stakeholders in new campaigns that aim at enhancing citizen engagement and consequently increasing legitimacy.

See Obama administrations struggling with the eRule initiative (Farina, 2013).
Ad 7) Technical system transparency

There should be a recordkeeping/Log of all technical system design decisions. In view of increasing sentiments of alienation when computers are involved, the importance of transparent design cannot be emphasized enough.

The design stage requires constant recording of design decisions made to create accountability of all design decisions that affect the translation from policy into norm into system design. This is particularly true for technical specialist stages in the build of new systems. The system should – where possible - be able to demonstrate legal effect visualizations in order for the public to be able to check the consistency of the system and to make judgments about the extent to which the designer has influenced the policymaking process. Transparency is a dissatisfier in the sense that it does not increase legitimacy, but the lack of it can cause legitimacy costs. Government should learn from businesses how to improve the digital personalization process.

Ad 8) Semantic clarification

The professionals are uniform in their statements that a maintainable set of vocabularies, taxonomies, symbols and issues with definitions should be available to all experts and users at all times. This avoids inconsistencies, incorrect comparison, endless discussions and provides insights in translation or interpretation problems. It also shows promise to be the main coordination mechanism in a complex webservice environment.

It was stated that there should be meta-regulations about digital processes, protocols and processes. Such efforts related to the digitalization of paper based processes in administrations are currently being made in Dutch parliament.

Some experts argue that government have an obligations to enable simple answers to simple questions regarding citizen’s health, citizen’s education and citizens safety in a trustworthy way. They agree that semantics are the key technology to render so called ‘open data’ to ‘linked open data’ (Mulder, 2015). The quest for the proper vocabularies and ontologies is not yet finished. Being a key technology for many services, all efforts to explore and experiment with this technology should be encouraged.

Ad 9) The Law is an infrastructure in itself

The specialists involved in the workshop came to the conclusion that law should be perceived as a service infrastructure in itself. Modern technology is an enabler. This position implies that some parts of the legal framework of policy making, permissions, obligations and prohibitions should be redesigned to enable the workings of a service infrastructure. It

also implies a number of additional aspects that have to be handled, especially in the case of co-regulation, such as:

- **Improved explicitation of legal vocabulary in machine readable format (such as XML and RDF).**
- **Standardization and explicit maintenance of those standards.**
- **Maintaining Consistencies.**
- **Explicit responsibility for the service infrastructure.**
- **Explicit Ownership of legal sources and other content.**
- **Inclusion of visualisations, such as provided by digital maps.**

Some of these aspects are covered within the ‘visie stelsel overheidsgegevens’ where transparency in law-making and law implementation is seen as a necessary condition for self-organizing citizens (BZK, 2014, P.4). The IMRO-Plan Text classification structure has become the IMOR-XML structure in the context of the new ‘Omgevingswet’ which illustrates this issue. Some researchers in the land ownership have started to explore the concept of law as an infrastructure rather than a supporting infrastructure for law (Ploeger, 2015). The key recommendation here is, that law is a basic infrastructure, the same way as drinking water is. Government — in its policy execution phase — can therefore not afford to remain fragmented in many competing ministries, or they will lose legitimacy because their incapability to coordinate becomes very visible in an advanced digital environment. Rousseau 2.0 implies renewing the bureaucracy. Cities and regions that experiment with pilots to coordinate the different policy regulations into one coherent digital service framework might show how this legal infrastructure should look like and should be encouraged with national funding.

**Ad 10) Explicitation of metrics**

Spatial co-regulation processes seem to lead to long debates about what was intended and what interpretation should be given to digitally voiced petitions (zienswijzen in Dutch). In line with Sheffield, 2007, and to avoid such debates, one should include extensive explicitation of the intended legal effect interpretations before turning it into operation to avoid endless discussions during the evaluation of the outcomes of operational policymaking process (see Chapter [VII]). This is especially relevant when participative approaches lead to a debate about evaluation metrics in a digitalised context. The metrics in participative GIS seem to become a problem because they were not defined before the decision stage.

At that stage the metrics become polluted by political motives (see also Chapter [VI], McAll, 2002, Aitken, 2002 and the Cap Gemini report about governance, Innes and Booher, 2004, Sheffield, 2007). The metrics in participative GIS seem to become a problem because they were not defined before the decision stage.
11.3. Research impact

In 2006 a report was produced for the ICTU and The Ministry of internal affairs about the ‘wat-mag-waar-kaart’: the ‘what-is-allowed-where-map (Peters and Woudenberg, 2006).

The test results and the positive reaction of the experts involved have cumulated in recognition by the eEnvironmental community during the INSPIRE conference in Prague where the concept received the best paper award from the Czech presidency. In addition the concepts were deemed usefull enough to be presented to the European parliament in 2009.

The geoscientific community acknowledged the research at the Spatial Data Infrastructure Convergence 2009 by adopting the results in the book on emerging research trends (B. v Loenen, SDI emerging trends, 2009).

Based on the results of this research a report <title plus ref> was produced addressing the impact of the INSPIRE European geo-standardisation effort on Dutch Provinces which was very well received (IPO, M. Bevelander, 2009).

In 2009, the results of the research were presented to the European Parliament eParticipation conference in Brussels176.

Figure 6: Presentation of the prototypes to European Parliament.

In 2010 the Dutch Government launched the Geozet177 initiative, based upon the ‘wat mag waar kaart’ that was developed as part of this research. This initiative aims at Geo tagging of all relevant government information enabling easy retrieval of information for citizens.

176 For presentations see: http://www.youtube.com/watch?v=USOoInExDoY
In 2010 the GIS appliance for service delivery addressed in this thesis was mentioned in the ‘vision for eGovernment’ document by Jeremy Millard for the Horizon 2020 European digital agenda.

The company Tercerra, partner in Flevoland’s living lab, who developed planning software included some of the legal processing knowledge and the notion of concurrency in new products. They managed to become sole supplier of all Dutch regional authorities and conquered a large piece of the small municipality market of Spatial planning Software.

In 2012 The Province of Flevoland abolishes the paper based Spatial planning cycle in favour of a permanent concurrent webservices system\textsuperscript{178}.

In 2013, the working group on the ‘Digital Agenda for environmental permit’ (DOA) working group adopts some of the ideas in their advise for the future digitalised Spatial planning and permit structure. PBLQ produces the \textquote{Digitaliseringstoets} that contains concepts from this research such as ‘uitnodigingsplanning’ en ‘wat-mag-waar-kaart’.

In 2014, the combined CIO’s and I-Architects of the Dutch Safety regions accepted VERA, the reference architecture for interoperability in emergency management. Geo information interoperability was a key-enabler described in the VERA documentation.

In 2015, many ideas of the research were used as input for the new ‘Omgevingswet’, such as including the temporal factor, the link between text and maps, the significance of advanced semantics, the usability of the service portal to enable end-users, the concept of the infrastructure (Laan van de fysieke leefomgeving) and retrieval based on text-inputs. These were input to the ‘Botsproef Juridische verankering digitaal stelsel’ and \textquote{Inventarisatie digitale wensen voor werken onder de Omgevingswet’}.

The spatial planning software company called Crotec, led by the same manager that provided the technology for Addwijzer in 2004, is key adviser in 2015 for the new ‘Omgevingswet’ from the supplier side.

11.4. Epilog: a sense of urgency

These last lines of the dissertation address the question of urgency. The question is if the Dutch Government - aside from the omgevingswet - should try harder in obtaining more experience about technologies to ensure that ‘le contrat Social’ is renewed. Is the ‘alternative digital bureaucracy’ eminent because of the lack of ‘fachwissen’in the government, or can we observe the emergence of a modern digital bureaucracy?

To start addressing this question, I will first provide some figures about www.overheid.nl to illustrate the relevance of that particular website. These show that the number of visitors was over 20 million in 2013.

Access page of www.overheid.nl in 2012. The legal service has been improved, but it still requires expertise about the Law to use the Law.

Figure ?: visitor statistics of the main Dutch government website www.overheid.nl 2004-2012.

4. statistieken

- Overheid.nl (portal plus alle onderdelen) 2013: 19,7 miljoen bezoeken
- 2012: 18,0 miljoen bezoeken
- 2011: 16,7 miljoen bezoeken
- 2010: 14,5 miljoen bezoeken
- 2009: 12,2 miljoen bezoeken
- 2008: 8,56 miljoen bezoeken
- 2007: 8,53 miljoen bezoeken
- 2006: 8,1 miljoen bezoeken
- 2005: 7,8 miljoen bezoeken
- 2004: 6,8 miljoen bezoeken
The question is if the apparent need of those services is met by an equal effort from government to design those services. Evaluations show that our government is doing a splendid job.

*In 2011, the Dutch Cabinet launched its ICT plan, called the ‘Digital Agenda’. This plan states, among other things, that they will start a program that will specifically address the services for businesses regarding regulations. ‘In afstemming met het bedrijfsleven en regelgevende overheden wordt in het najaar 2011 een strategie opgesteld over hoe en onder welke voorwaarden regelhulp voor ondernemers breed kan worden ingevoerd’. This translates as: after consultation with the business sector and the regulatory authorities, we will set a strategy about how and under which conditions the legal support service can be implemented (Digitale agenda, 2011).*

An evaluation assigned by Minister Verhagen of economic affairs to the consultancy agency PWC in answer to questions from the members of Parliament about the “dienstenloket bedrijven” (Single points of contact) providing information about permits to business managers: “Ondernemers zullen voortaan in principe voor hun overheidszaken, zoals objectieve eerstelijns informatie en advies, aanvragen van subsidies, BTW-nummers en inschrijving in het handelsregister, 24 uur per dag terecht kunnen bij één digitaal loket, het Ondernemersplein. Dit Ondernemersplein zal ondersteund worden door voldoende toegankelijke fysieke ondernemersloketten.” Translates as: Business managers will be enabled to 24-hour access one digital helpdesk for all issues regarding: factual information, consult, subsidies, VAT, and Chamber of commerce registration. This will be enabled by the “Business Desk at the ‘Business Square’. (Tweede Kamer (march 2011). Bedrijfslevenbeleid; brief van de minister van Economische Zaken, Landbouw en Innovatie. Kamerstukken 32 637, nr. 1. To comply with: EG (2006). Dienstenrichtlijn, 2006/123/EG, Pb. L 376/36). (Parliament, business policies, letter by the Ministry of economic affairs, 2006)

*“The Netherlands is leading Europe!”: “According to the European Chamber of commerce The Netherlands is way ahead of the others! 1,8 million website visitors in 2012! The basis for this research claim, as abundantly stated by the investigators who were responsible for the research report: ‘It seems it helps with aggregation and access to regulations and permits’. The two companies actually interviewed were asked questions that seem to concentrate on “do you like what we do now?” They were not asked: “what do you need”? It remains questionable if the current service ‘dienstenloket bedrijven’ provides the services the users actually need as this hasn’t been part of that evaluation.*

All in all the evaluations that at a first glance give the impression that the government has done a good job, may be misleading. Moreover this may obscure the urgency to improve and affect the political will to act upon it.
11.4.1. The old reflex of abolishment of laws

Another strategy to address the regulatory complexity has been mentioned earlier in this dissertation. There, I have mentioned the trend to think that the complexity of regulatory frameworks can be addressed by simply getting rid of them (Arendsen, 2009). The same adagium still seems valid in 2013: ‘Op 30 januari maakte het ministerie van Economische Zaken (EZ) 11 regionale ambassadeurs bekend die aan de slag gaan met het afschaffen van onnodige lokale regels. Ze inventariseren welke landelijke regels op lokaal niveau voor ergernis zorgen en wellicht afgeschaft, versoepeld of vereenvoudigd kunnen worden’ (2013).

Translation: ‘On January 30st, the Dutch Ministry of Economic affairs appoints eleven ambassadors that will form a taskforce for the abolishment of unnecessary regulations. They will make an inventory about what regulations are cause for irritation and could be abandoned, or made more flexible or simplified.

The claimed legal complexity is not only a problem for the citizens but also for the administration responsible for the execution thereof. This is demonstrated by the Dutch Minister of Finance Wiebes who declared that the Tax system and Taxation law is so complex that it cannot be maintained (may 2014).

The ICTU also claims that the Dutch government is very successful in diminishing the administrative burden through the abolishment of regulations. The question is how one measures the benefits and if there really any progress made. ‘De afgelopen jaren zijn door het terugdringen van de regeldruk de administratieve lasten al met bijna 850 miljoen verlaagd. Daarnaast werd door het afschaffen van onnodige regels en voorschriften de nalevingskosten van bestaande regels met 100 miljoen verlaagd. Het programma Slim geregeld, goed verbonden (Sggv) dat van 2009 tot en met 2012 door ICTU is uitgevoerd heeft bijgedragen aan die besparing’. Translation: Over the last few years the administrative burden has been reduced by 850 million. By abolishing regulations an additional 100 million has been saved by reducing enforcements costs. The program has contributed to these savings.

These claims are again interesting. They suggests that are savings in enforcement and there are savings in administrative burden. It would be beneficial for the legitimacy of government if the metrics that were applied here, would become standardised and made available for longitudinal research. There are some severe doubts about the calculations, of course: ‘Omdat tegelijkertijd het aantal toezichthoudende instanties met vaak vérgaande controle- en sanctiebevoegdheden sterk is uitgebreid, is echter een controlecultuur ontstaan die leidt tot risicomijdend gedrag. Het gevolg daarvan is dat het met vermindering van regels beoogde doel – méér bewegingsvrijheid en vergroting van de eigen verantwoording - niet wordt bereikt’ (Teunissen 2007). Translation: The number of enforcement agencies with very serious...
administrative power has been significantly enlarged. This resulted in a control-culture that leads to risk-avoidant behaviour. This in turn leads to the fact that the intended results of diminishing the amount of regulations – more freedom and increase of the individual responsibilities – has not been achieved.

The myth of the ‘administrative burden’ is persistent and – in my view – a counterproductive simplification of the problem space. The paradigm of administrative burden defines the main product of government: the issuing and execution of regulations - as a burden. This is strange from the viewpoint of the agreement made between government and citizens in Rousseau’s Le contrat Social, it is also strange from a social constructivist view of the communicative action of Habermas and it directly undermines legitimacy of government. Administrative burden occurs when we design digital systems that are not helping or performing the required service. Regulations are an essential part of society (Weber, 1929) and should be maintained the same way as any infrastructure. This puts high demands on this infrastructure that should allow for such maintenance as I have described in this thesis.

11.4.2. About rankings and the Dutch interpretation of achievements

The Netherlands claims to be the top of Europe. When members of parliament ask for the state of affairs, our Ministry has consultancy agencies produce the politically correct answer: we are state of the art. The question is again: state of the art in whose view? The United Nations survey shows that the Netherlands is top of the world: Fifth place on the eGovernment index and first place on the eParticipation ranking. The elements that constitute that ranking are listed in figure x.

Figure?: UN ranking in eGovernment and eParticipation.
The eGovernment ranking is justified with some summary findings: [...] The Netherlands has already met the ambitious goal it set in 2004 to reduce the country’s overall administrative costs by 25 per cent and is aiming for a further overall government saving of US $1.8 billion by 2018 through an e-government enabled whole-of-government approach. An important element of the e-government programme of the Netherlands is the ‘Digital-by-Default’ strategy designed to move as many services to citizens and businesses as possible online [...] (p.32, 2014). It is unclear to me how the number of 1.8 billion has been calculated and if the overall administrative cost reduction claimed of 25% has actually been achieved. Also here we are faced with unclear metrics of costs and benefits. The adaption of the ‘whole-of-government’ approach seems to be relevant though. The Australian government defines the approach as: ‘Public service agencies working across portfolio boundaries to achieve a shared goal and an integrated response to particular issues’.

Figure 7: features that result in the UN eParticipation ranking.

<table>
<thead>
<tr>
<th>Table 3.1. Summary of features assessed related to e-participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Existence of archived information (policies, budget, legal documents etc.) related to education, health, finance, social welfare, labour information and environment</td>
</tr>
<tr>
<td>+ Existence of datasets on education, health, finance such as government spending, social welfare, labour information and environment</td>
</tr>
<tr>
<td>+ Access to government website in more than one official national language</td>
</tr>
<tr>
<td>+ Availability of social networking features</td>
</tr>
<tr>
<td>+ Presence of e-consultation mechanisms for the six sectors: education, health, finance, social welfare, labour information and environment</td>
</tr>
<tr>
<td>+ Availability of tools in order to obtain raw (non-deliberative) public opinion for public policy deliberation such as online forums, media tools, polls, voting tools and petition tools</td>
</tr>
<tr>
<td>+ Presence of e-decision-making tools for the six sectors: education, health, finance, social welfare, labour information and environment</td>
</tr>
</tbody>
</table>

Quote?
The rankings are clarified with some texts:

‘When government portals provide facilities for e-decision-making – such as

- a stated online e-participation policy;
- an online calendar of participatory events;
- online procurement announcements;
- online citizens’ right to government information;
- and outcome of participation in a new policy, service or decision-making –

then ‘they are beginning to empower citizens to meaningfully and effectively engage in public policies and co-produce public services’.

It is unclear to me why these ‘features’ are used to measure eParticipation performance. They are not related to the eParticipation features set by the United Nations (McCall 2002, Berntzen, 2005, see Chapter [VI]) What is the relation between information provision and ‘substantive participation’? It is also not very clear to me why the Netherlands would rank number one in the world based on these features. It seems that these rankings are based on the reading of government websites. It does not seem to be based on investigations among citizens and companies, who would be the participating clients. The overall picture also suggests a low sense of urgency to really involve citizens in participating in co-regulation activities like the one described in this thesis. If the Dutch are the best in the world, there is no problem, is there? Future research using more informative metrics rather than the politically chosen ones that have been used thus far is needed.
There are more signs that we are too optimistic in measuring the service performance: Inspraak 2.0 op wetten mislukt: http://www.internetconsultatie.nl/. De website van de Rijksoverheid die inspraak op wetsvoorstellen toegankelijker moet maken, leidt een kwijnend bestaan\(^{180}\) (Hartman 2010).<add translation> In 2013 this website seems to be used slightly more <ref>. Dutch Parliament decided to continue investing in this website.

### 11.4.3. Light in the dark

There are some signs in Dutch National ICT-management that look promising, such as the fact that a Commissioner for Digital government (Commissaris digitale overheid\(^{181}\)) has recently been appointed.

**Figure 1:** ELO-City (electronic government), a 2002 overview of eGovernment services with great ambition.

This commissioner has an interesting job being the chair of the high level ‘National Digiplatform’. One of the ambitions of this platform is to revive the website that sparked this research: [www.overheid.nl](http://www.overheid.nl), [...] Ambitie: Overheid.nl zoveel mogelijk inrichten op herkenbare situaties, een indeling op life-events is daar een mogelijkheid voor. Translation: Ambition: redesign of Overheid.nl in such a way that it caters for recognisable situations, a structure based on life events is a potential direction for that design [...]. This puts user centeredness higher on the agenda for the design of eGovernment services. A second ambition is dedicated towards the design process itself:


\(^{181}\) See also: Nationaal Digiberaad: Oplegger uitwerking ambities vertrekpunt 2017 20141209.03.01
Vraaggericht ontwerpen van digitale dienstverlening met aandacht voor behoeften van burgers en bedrijven: Ambitie(s):

- **Burgers en bedrijven beter betrekken bij beleids- en ontwerpcriteria voor digitale overheidsdienstverlening is een aandachtspunt voor de individuele organisaties.**
- **Initiatieven voor gemeenschappelijk gebruik worden bij gemeenten en uitvoerings-organisaties, in pilotvorm ontwikkeld vanuit burgerperspectief. Het is zeer wenselijk dat succesvolle initiatieven gestandaardiseerd en breed ingezet kunnen worden.**
- **Deze kunnen worden opgepakt met de klankbordgroep(en) voor burgers en bedrijven […]**

This Translates as:

The design process should be more service oriented from the perspective of the user and his needs:

- Organise more engagement and involvement of citizens and businesses while determining the policy and design criteria for digital government services. This is an item in need of attention from individual government agencies.
- Initiatives (for the design of services) are to be designed in pilots at cities and executional agencies from the perspective of the citizen. It is very desirable that successful initiatives are implemented in a much wider spectrum of organisations.
- These initiatives can be adopted by engagement groups of citizens and business.

Another light in the Dark is the Dutch KEI-programme for the modernisation and digitalisation of law. It is promising that the experts at the Spir-It ICT-department of the Dutch Council of Judiciary managed to position the judges as ‘owners’ of the ICT design processes. It is also promising that they have a team of seven interaction design specialists (The User Experience team) dedicated to help with the user centeredness of the legal design processes. They apply smart interaction design techniques, such as personalised use cases (made visible on every wall of the building as a reminder about who they are actually working for) and extensive storyboards (klantreizen) to describe in detail the practice of thousands of Dutch legal administrative experts and judges to manage those daily avalanches of paper. Stefan and his design team agree that the ‘holy grail’ of design would be achieved when they would be able to provide feedback to the ‘legislators in The Hague’. All designers in the room from several Ministries agree that this would spark a debate about Trias Politica, which they – as technicians – will not be partaking in. Some scientists think ahead and encourage the transparency and the potential of equality that this digitalisation process of the KEI programme will provide. At the same time they warn us for the automation of processes, that in the end are designed to address the uniqueness of each individual case (C. Prins, 2016). The tension between supportive technology and bad design will remain.

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\[182\] User centred design session (gebruiker centraal), Council of Judiciary, Utrecht, March 15th, 2016
11.5. Marcuse given a voice

And Marcuse? What would Herbert Marcuse, the once-famous writer of the ‘student revolutionary bible’ have said about the conclusions of this research about the application of technology to increase legitimacy? First of all I am reasonably sure that Marcuse would state that any scientist and thus any scientists opinion was brainwashed by the High Industrial establishment and was too much part of that comfortable layer of technologically enabled and inert consensus as a result. ‘where these reduced concepts are guiding the analyses of human reality, either individual or social or mental or materialistic, they will lead towards a false truth, a truth that is not connected any more to the conditions that create that reality (Marcuse, 1964, p.127)’. The outcome of the experiments were – if we would take his position – based on empirical data obtained from other ‘addicts to the technology’ and therefore void of real meaning. Only art and students could unmask this establishment. Marcuse lived in the time of the A-Bom and was convinced that the cold war was created to maintain power and status quo by an establishment of a small industrial-political elite that controlled mass media such as television and used it to maintain that control. The interesting question is if the bottom-up designed internet[^183] could be defined as ‘manipulated by the establishment’ and would fit with Marcuse’s fears of instruments for manipulation. Twenty two years after its conception in 1993, the World Wide Web is definitely being controlled in some totalitarian countries. And the taken-for-granted use by unquestioning citizens of world-spanning infrastructures owned by players like Google and Facebook are feeding a lively debate about privacy, net neutrality and transparency. So Marcuse still has a point. He would probably say that the efficiency paradigm behind ICT projects is in fact a smoke screen for more control by fewer people. However, I think the danger of digital government bureaucracies without any understandable rationality has now become larger than the risk of totalitarian control or manipulation by maleficent dictators, because it is much less visible, require specialised knowledge if one would want to examine them and those rogue bureaucracies are much harder to fight.

Some of the dangers are mentioned here: indulgence with quasi results, unclear performance metrics, simplifications or even myths, such as ‘failing ICT projects’ or ‘administrative burden’ and fragmentation among ministries. Perhaps we are still facing Shelley’s views on technology; the good old Frankenstein complex (Shelley, 1817). The current Frankenstein is perhaps more like a digital Kafka. I hope this work will provide some hope that technology may make the citizens struggle with complex legislation less cumbersome but also creates some sense of urgency to those who are in a position to teach that digital bureaucracy to explain itself to citizens before they get lost and the computer says: ‘not here’.

The End

[^183]: The internet was based on ARPAnet, a facility for military purposes, but was adopted by too many technologists to maintain that it was organised in a top-down fashion.
The notion of an efficient government implies that governments can also be inefficient, which can be interpreted as unwise spending of tax payer’s money. Weatherford claims that there is a relationship between the actor’s perception of efficient government and legitimation of government.

Weatherford

I have only found this relation as expressed by government officers and politicians, but have not found any evidence of this relation when citizens or business managers were concerned in relation to their own use case.
Appendices

Appendix [1]

Short Guide for the reader

The document before you is written from the perspective of a ‘user’ of law, who faced a problem – the relocation of a LPG station - because the current location of that LPG station was judged to be positioned dangerously close to the new houses that were built in the town of Katwijk. This was the result of national policies that were translated into regional and local rulings by his chosen government. This user experienced a ‘feeling of bewilderment’ because he engaged on a Kafkaesque trajectory to find an alternative spot for his business. No other city wanted LPG stations. This perspective seems straightforward and not so very special, but it evolved into a long and multidisciplinary research journey. Not all readers are equally thrilled by all the stops on that road trip, however interesting that journey may have been. On the other hand, we are all citizens that deal with law in one way or the other, and we may all face the same bewilderment in the future. One of the research claims of this research is, that the chances for such confusion to occur might actually increase because of the inadequate digitalisation of legal processes. For those fellow citizens I provide some hitch hacker guidelines for reading this manuscript. Chapter [I] addresses the origin of the research question and is therefore hard to avoid. Chapter [II] involves a lot of scoping, exploring definitions of legitimacy, exploring design as a concept and some methodological issues. I would recommend reading the paragraphs about the history of technologies in relation to legal content for those who rather skip this elaborate exploration. Chapter [III] demonstrates some early try-outs of the mapping technology. The pictures tell the story, even if you do not want to read about all the design challenges. Chapter [IV] is about infrastructures, services, eGovernment and the relation between law and a digital service infrastructure. This chapter is perhaps a bit tedious if you are not so much fascinated by the challenges involved in making technology work at a national scale. Chapter [V] is about the second test with users and important for those who investigate user centered service claims. I do recommend paragraph 5.6 about the comments of the respondents in that test for those who would like to skip the statistics. Chapter [VI] is a new exploration, this time about co-regulation and participation in the design of Law. Because of the developments in Dutch thinking about self-reliance of citizens (participatiemaatschappij), this chapter became much more relevant for contemporary debates than I originally expected. Chapter [VII] contains a description of the IJmeer/Markermeer re-design case which I used as the canvas for an experiment about technology supported co-regulation. This research case became more relevant over time because of the developments of the ‘omgevingswet’, the Dutch Spatial law
in-the-making. Chapter [VIII] is perhaps a bit technical. It shows how things were translated from abstract theory into working practice and how old gaming technology – 1985 is ancient history in gaming - was used as inspiration for the solution of ‘real world’ problems. I do recommend all non-technical readers to have a closer look at the pictures in this chapter. It is hard to understand concepts such as ‘digital negotiation support’ and ‘eConsideration technology’ without those. Chapter [IX] represents experiment [III] where the technology was tested. One could read only 9.4 for the conclusions, if time is short. Chapter [X] sums up the combined findings of the three experiments and offers a conclusion and some critical reflection. Chapter [XI] is both a reflection about 10 years of work and the spot where I took the liberty to explore the future problem space, the research required and its implications. During the second part of this chapter I change roles from researcher to eGovernment design consultant and offer my recommendations for the digitalisation of the legal domain. I hope that next time you have to fill an internet form to fulfil some obligation of the government bureaucracy, you think about this thesis, perhaps a little more curious about the world behind that computer screen.
Appendix [2]

Glossary of terms

**Accessibility to law**: The technical possibility of the user of legislation to access legal sources, articulate a question and find potentially relevant rules.

**Adjudication**: The execution of law (de rechtspraak, de berechting).

**Architecture**: The fundamental organization of a system embodied in its components, their relationships to each other and to the environment and the principles guiding its design and evolution’ (ISO 42010, 2007, P3). This definition is extended by TOVAG: A formal description of a system, or a detailed plan of the system at component level to guide its implementation, the structure of components, their inter-relationships, and the principles and guidelines governing their design and evolution over time’ (TOVAG, 2009, P9).

**Case assessment**: Business managers and advisors required legal knowledge support to understand the implications for their case where they themselves could prepare a ‘viable’ case before taking it to a legal expert for completion.

**Communicative action**: The action of the agents involved are coordinated not through egocentric calculations of success but through acts of reaching understanding. In communicative action participants are not primarily oriented to their own successes. They pursue their individual goals under condition that they harmonize their plans of action on the basis of common situation definitions. (Habermas, 1984; p.286).

**Co- regulation**: I will treat participation and co-regulation as essentially different levels of intensity for joint prioritisation or balancing interests between government and stakeholders.

**Discourse**: that form of communication that is removed from contexts of experience and action and whose structure assures us:

- that the bracketed validity claims of assertions, recommendations, or warnings are .. the exclusive object of discussion,
- that participants, themes and contributions are not restricted except with reference .. to the goal of testing the validity claims in questions;
- that no force except that of better argument is exercised; and
- that all motives except that of cooperative search for truth are excluded. (Habermas, 1975; p.107-8)

**eParticipation**: In present research, I will treat participation and co-regulation as essentially different gradations of shared responsibility for prioritisation and interest.
balancing between actors from government and actors from stakeholders. These
gradations are identified by two aspects:

- Taking responsibility for the allocation of money between different priorities
- Taking responsibility for the design of legislation that sets the norms and constraints
  for fellow citizens.

**eParticipation** refers to “ICT-supported participation in processes involved in
government and governance. Processes may concern administration, service delivery,
decision making and policy-making.” (Avdic, Hedström, Rose and Grönlund, 2010).
Instrumental eParticipation research, by contrast, involves the following: “Determining
the tools and methods which are appropriate for pursuing these goals. Here researchers
have the task of understanding the different contexts of eParticipation, and developing
better frameworks, procedures, methods and software tools for varying contexts and
objectives. This research has the objective of improving the practice of eParticipation
(Sæbø et al. 2009).

**eDeliberation**: A term that is close to ‘participation’ that deals with the commutative
aspects in the debate about co-regulation is ‘deliberation’ (Black et al, 2014). In their
article about the disappointments of the political idealists when the internet technology
did not bring democratic utopia, Hartz and Sullivan are proposing a different, less
ambitious line of practices for ‘eDeliberation’. (Hartz, 2014). Specifically, they propose
to limit the role of technology to the role of informing participants about the ideas and
plans of other participants rather than the role of co-decision making.

**eConsideration**: A term I use to indicate that digital technology that allows actors to take
the interests of others into consideration. The explicit goal of this technology is to enable
the process of attributing ‘responsible’ as a function to an actor or to an authority. This
is in line with Carver, Habermas and Oosterhout and it is my technical operationalisation
of the process of legitimism. The technology is inspired by Sim City, but it is the visible
process of seeking optimal solutions in full view of the other plans of action that generates
legitimation. The end-status of the location and conditions of a number of plan is only
part of the co-regulation process. The fact that the participants can see what other actors
have tried to amend in their plans is the relevant functionality that can only be achieved
by digital means.

**Effectivity** of legal services can be defined as the extent to which the public administration
implements the policies of political decisions in an effective service delivery manner.
The citizen or business manager is informed in an effective way about the intentions of
government and he knows what his options are. This is a form of alignment between
policies and services.
Inter-operability is defined by the European Commission as follows: ‘A set of standards
and guidelines that describes the way in which organisations have agreed, or should agree to
interact with each other’ (IDABC, Malotaux et al, 2007).
Judicial process: The legal government service process (de Rechtspraak als uitvoeringsprocess).

Judiciary: The system of law (De Rechtspraak in algemene zin).

Jurisprudence: The recorded case law (geheel van gezagdragende juridische uitspraken van rechtsprekers.
Ref: [www.rechtspraak.nl/Wat+is+rechtspraak/Begrippenlijst+van+A+tot+Z.htm](http://www.rechtspraak.nl/Wat+is+rechtspraak/Begrippenlijst+van+A+tot+Z.htm)

Knowability of law is defined here as: The possibility for the user of legislation to understand the effect of rules in the context of the use case and its societal environment.

Lebenswelt: Habermas develops his theory of rational commutative action into a view on the gap between what he calls the "life world" (Lebenswelt) and "public sphere": a micro level world where participants in communication come to an understanding with one another about something" (p.337) and the larger scale social system.
Life world: "Whereas societal rationalization involves the institutionalisation of a normative system, life world rationalization involves permitting "interactions that are not guided by normatively ascribed agreement, but by communicatively achieved understanding.

Legal source: The elements accepted as binding law in a legal system (Valente, 1996, P49).
A source of law is a writing that may be used to back an argument concering the presence of a legal rule, or another legal identity, in a certain legal institution, the result of a legislative act performed with the intent of creating that legal rule, and evidence of the occurrence of that legislative act. (Boer en van Engers 2010, P51)
Legitimacy counts as criterion for all governmental actions and can be described the societal acceptance of those actions', (Dutch National Council of Public Administration, 1999, p.64).

Legitimacy cost:
The damage to the fabric of commitment from citizens to government to obey laws, follow rules and stay civilised in the sense of 'Le Contrat Social'. An operationalisation of this damage is all the investments that governments make to prevent citizens from losing their commitment to obey laws, which deteriorates support for the legal system. Examples of these costs are increased enforcement costs, failed ICT projects, increased fraud, decreased economic investments, more law suits, more appeals in court and a decreased motivation to vote. These costs are defined here as 'legitimacy costs'.
Legal infrastructure is defined here as follows: 'A consistent and coherent structure of principles, standards, services and applications that supports the legislative process (the policymaking process and the legislative production process) and the legislation in action (implementation, case handling, monitoring, enforcement)'

477.
The legal service infrastructure is defined here as: ‘A digital legal service infrastructure is the network of functionalities that together deliver legal eGovernment services according to a well-defined architecture’.

Jurisdiction: is defined here as the area of applicability of law.

Legal pluralism184 “The presence in a social field of more than one legal order”. (Griffiths, 1986, Merry 1988).

Legal effect planning can be phrased as: We have many regulations affecting one location. The legal effect planning enables a client to regard all (digital) legal information regarding that location so that the resulting purpose on the map - as seen by the citizen - reflects what the legislator intend it to reflect in order for the client to plan his or her activities in compliance with the regulations.

Ontologies are agreements about shared conceptualizations. Shared conceptualizations include conceptual frameworks for modelling domain knowledge; content-specific protocols for communication among interoperating agents; and agreements about the representation of particular domain theories. In the knowledge sharing context, ontologies are specified in the form of definitions of representational vocabulary. A very simple case would be a type hierarchy, specifying classes and their subsumption relationships. Relational database schemata also serve as ontologies by specifying the relations that can exist in some shared database and the integrity constraints that must hold for them. (Tom Gruber, 1994, SRKB Mailing list).

Ontology mapping is the task of relating the vocabulary of two ontologies that share the same domain of discourse in such a way that the mathematical structure of ontological elements (classes and their relationships) and their intended interpretations, as specified by the ontological axioms, are respected (Kalfoglou, et al, 2003).

RDF:
The Resource Description Framework (RDF) is a language for representing information about resources in the World Wide Web [179]. The basic notion of RDF is a data model that uses statements, (called triples), containing a subject, an object and a predicate that relates subject and object (see Figure 4.2). The RDF data model is a graph [249]. RDF uses an XML syntax for exchanging its graphs, called RDF/XML.

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184 I refrain here from the 50-year debate on normative pluralism versus informal legal pluralism (see , Tamanaha, 2008), since the complexity of traditional Weberian public institutionalised enforcement of norms is already more than enough to justify the question of legitimation by support of technology. Legitimation of other, more informal social norms supported by technology is perhaps an interesting new research field for legal anthropologists, and many "web 2.0 debates" are sparked right now by social media, but not for this dissertation.
Responsibility as part of legitimizing process:

..thus our cognitive understanding of responsibility, to start with, requires that one must be able to understand certain facts as the possible result of the act or omissions of an intentional actor, thereby making such ascription a necessary condition for correct use of the concept of responsibility. And our regulative understanding of responsibility, secondly, necessitates there being both an unambiguous normative background consisting of explicit action guiding normative expectations and an accountability practice that can uphold these expectations. Our normative understanding of responsibility, finally demands that the actor to which responsibility is attributed satisfies certain necessary conditions in order to justifiably be held responsible Oosterhout, (105).

....there are three alternative mechanisms by which the status function ‘responsible’ can be socially imposed on actors and agents. our cognitive understanding of responsibility, firstly, explains how social processes constitutive of human cognition label and fixate the status function of responsible for X on what is or can be understood as the intentional cause of X. Our regulative understanding of responsibility, secondly, focuses on how considerations of efficacy in upholding certain normative expectations (N) in a given context (C) are decisive in imposing the status function ‘responsible’ for the realisation of (N) on actors or authoritative agents interacting with (C). Our normative understanding of responsibility, finally, points at the role that normative and valutational considerations play in imposing the status function responsible on actors[...](Oosterhout, P133,2002).

Oosterhout defines the attribution of responsibility to actors or to authority as a process – an ongoing process of co-construction of reality among a group of actors. It is therefore not a static thing with pre-defined specifications. This theory or conceptualisation allows for attributing ‘responsible’ as a status function to an authority like government.

A spatial data infrastructure (SDI) is defined as the infrastructure that provides the framework for the optimization of the creation, maintenance and distribution of geographic information (and environmental data by specialization) at different organization levels (e.g., regional, national, or global level) and involving both public and private institutions”. In this line, the European Commission launched INSPIRE (INFrastructure for SPatial InfoRmation in Europe, Nerbert D. 2004).

It is elaborately defined by Groot and McLaughin as; a set of institutional, technical and economical arrangements, to enhance the availability (access and use) for correct, up-to-date, fit-for-purpose, and integrated geo-information, timely and at an affordable price, with goals to support decision making processes related to countries sustainable development”(Groot and McLaughin (2000, quoted in van Loenen, Besemer & Zevenbergen, 2009, p.11).

Policy making is: ‘the process that leads from identifying a problem to the formulation of a policy to solve it’ (van Engers and de Boer).

Services: The application of specialized competences (skills and knowledge) through deeds, processes and performances for the benefit of another entity (Vargo & Lusch, 2004, p326).

A Semantic interoperability framework is the combination of ontologies, their relationship, and methods for ontology-based description of information sources (services, data sets, etc). The framework serves the semantic interoperability between information sources (Lemmens, 2006).

Trust: Trust is defined by Rousseau as: ‘trust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another’ (Rousseau, 1998, P395).

Usability: ISO/IEC 9126-2 (product quality metrics)
Usability metrics measure the extent to which the software can be understood, learned, operated, attractive and compliant with usability regulations and guidelines.


Usability: the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.

Verrechtlichung: Juridification.

Juridification is an ambiguous concept with regard to both its descriptive and normative content. In descriptive terms some see juridification as “the proliferation of law” or

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186 Juridification is related to two other concepts, “judicialization” and “legalization”, concepts that are sometimes used more or less synonymously or at least overlap with the concept of “juridification” as we understand it.
7 See for example Harry W. Arturs and Robert Kreklewich, “Law, Legal Institutions, and the Legal Profession in the New Economy”, in Osgoode Hall Law Review, Vol. 34 (1996), No. 1, p. 29.: “This process of extrapolating expectations of lawfulness and fairness from state courts to other public agencies, and from the state sphere to private institutions, we will refer to as juridification.”
as “the tendency towards an increase in formal (or positive, written) law”; others as “the monopolization of the legal field by legal professionals”, the “construction of judicial power” \[187\], “the expansion of judicial power” and some quite generally link juridification to the spread of rule guided action or the expectation of lawful conduct, in any setting, private or public. These are but a few of the shorthand definitions presented in the “juridification literature”.

**German explanation of Verrechtlichung:**


**Whole of government approach:** Public service agencies working across portfolio boundaries to achieve a shared goal and an integrated response to particular issues. An approach that integrates the collaborative efforts of the departments and agencies of a government to achieve unity of effort toward a shared goal. Also known as interagency approach.

eGovernment and whole of government: The entry point for an integrated approach to whole-of-government is to determine the baseline conditions which allow for collaboration, across and between departments, through institutional arrangements so that the ensuing system is holistic, synergistic and coordinated in the delivery of public services (United Nations eGovernment survey, 2012).

A **Web service** is a service offered by an electronic device to another electronic device, communicating with each other via the World Wide web. In a web service, web technology such as the HTTP, originally designed for human-to-machine communication, is utilized for machine-to-machine communication, more specifically for transferring machine readable file formats such as XML and JSON. In practice, the web service typically provides an object-oriented web based interface to a database server, utilized for example...
by another web server, or by a mobile application, that provides a user interface to the end user. Another common application offered to the end user may be a mashup, where a web server consumes several web services at different machines, and compiles the content into one user interface.

The W3C defines a Web service generally as: a software system designed to support interoperable machine-to-machine interaction over a network.\(^{188}\)

Zweckrational: the law is a rational technical apparatus which is continually transformable in the light of expediential considerations (zwechrational) and devoid of sanctity or content’ (Habermas p.350). Zweckrational is one of Weber’s four major types of social action, together with affectual action, traditional action and value-rational action.

Zwechrational or Instrumentally rational, that is, determined by expectations as to the behaviour of objects in the environment and of other human beings; these expectations are used as ‘conditions’ or ‘means’ for the attainment of the actor’s own rationally pursued and calculated end (M. Weber, Economy and Society, 1992, 212). The problem takes shape when this formal sphere of means-ends becomes autonomous, is totalised, when what can be done with ‘efficacy’ (technically and economically) determines what is used as the ultimate criterion of ‘validity’. When this happens, one falls into formal absolutization, in the error indicated by Horkheimer, Adorno or Marcuse, namely, giving priority to ‘instrumental reason’ (as explained by E. Dussel, ethics of liberations, 2013, P.186).

All of which I have been extrapolating into a world where Law is digitalised and the risk of an ‘autonomous’ sphere becomes very real, of course (the Author).

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\(^{188}\) https://www.w3.org/TR/2004/NOTE-ws-gloss-20040211/#webservice
Appendix [3]

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509.
Appendix [4]

Survey Questionnaire Experiment [II]
translated in English

Thank you very much for participating in this research. In conclusion, I would like to ask you to accurately fill in the questionnaire below.
NB: All provided information will be treated confidentially.

<table>
<thead>
<tr>
<th>Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender:</td>
</tr>
<tr>
<td>Age:</td>
</tr>
<tr>
<td>Occupation:</td>
</tr>
<tr>
<td>Date:</td>
</tr>
</tbody>
</table>

Please rate to which degree you agree with the statements below.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have experience in dealing with legal information.</td>
<td></td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>I frequently work with geographical data, such as maps and plans.</td>
<td></td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>I am handy when it comes to computers.</td>
<td></td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

The following questions are about the traditional system, whereby you’ve looked up information using paper documents.

<table>
<thead>
<tr>
<th>How much time did you spend using the documents? (mm:ss)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>How much time did you spend using this computer program? (mm:ss)</td>
<td></td>
</tr>
</tbody>
</table>

The following questions are about the computer program "Legal Atlas" with which you have worked during the research.

Next up are 50 statements concerning the computer program. We ask you to rate them all. Next to each statement are three boxes:

AGREE Mark the first box if you generally agree with the statement.
NO OPINION Mark the middle box if you are unable to have an opinion about the statement, for instance because the statement doesn’t connect with your usage of the computer program.
DISAGREE Mark the third box if you generally disagree with the statement.
In summary, what’s important is your general impression. AGREE or DISAGREE do not necessarily point to a strong concurrence or denial; NO OPINION you only mark because you cannot possibly have an opinion about the statement. If you do not understand a question or find it to be non applicable, please place a question mark next to the question. You are strongly requested not to modify questions by including writing to them; your answer will become invalid.

<table>
<thead>
<tr>
<th></th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>This computer program responds too slowly to input by the user.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I would recommend the usage of this computer program to my colleagues.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>The user is helped by instructions and by signs that user input is expected (prompt).</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>At some time, the computer program stopped unexpectedly.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>In the beginning, learning to work with the computer program causes many problems.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>With this computer program I often have no idea what to do next.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I like working with this computer program.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>The messages of this computer program are not very helpful.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>If the computer program stops it can easily be restarted.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>It takes too long to learn this computer program’s commands.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I often wonder if I have used the right command.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Working with this computer program gives me satisfaction.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>The way in which system messages are displayed is clear and understandable.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>It makes me feel safer to only use a few commands that are known to me.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>It seems like working smoothly is made impossible by the computer program.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Working with this computer program has a stimulating influence on the mind.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>There is never enough information on the display if it’s needed.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Statement</td>
<td>Agree</td>
<td>No opinion</td>
<td>Disagree</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------</td>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>I have the feeling of mastering this program.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I prefer to use the services of the computer program I’m familiar with.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I think this computer program is not consequent.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I wouldn’t want to use this computer program every day.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can understand the messages of this computer program and do something with them.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This computer program is unhandy when I would like to do something that doesn’t resemble the default.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The tasks can be performed without difficulty using this computer program.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The use of this computer program is frustrating.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The computer program has helped me in solving problems I encountered during use.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The response time of this computer program is quick enough.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is obvious that users’ wishes were taken into account.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There were moments I felt tense using the program.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The layout of the menu’s and information lists look logical.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With this program not many keys have to be entered.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning new functions is difficult.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too many steps are necessary to get something done.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The computer program sometimes gives me a headache.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The messages that have to prevent errors are not sufficient.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>No opinion</td>
<td>Disagree</td>
</tr>
<tr>
<td>-----------------------------------------------------------------</td>
<td>-------</td>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>I will never learn all that the computer program has to offer.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>The computer program did not always do what I expected.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>The computer program has a very attractive presentation.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>The quantity and the quality of the help information varies over the different parts of the program.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I can jump from one task to the other relatively easy.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>You easily forget how to do things with this computer program</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>The computer program sometimes behaves in an erratic fashion.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>This computer program is really unhandy.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>During every step it is possible to see the available options in the blink of an eye.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>When I use this computer program I need help most of the times.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

**Next up are some statements about the functionalities of the computer program.**

<table>
<thead>
<tr>
<th></th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigating with the map is troublesome.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I can use the function “display on map” in my occupation.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Clicking regions on the map to retrieve texts works less well than the function “display on map”.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>It is simple to navigate the text using the computer program.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>The function “display on map” can also be used to perform other tasks.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>While reading an article it is difficult to know which regions the text applies to.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>For selecting all areas an article applies to I see no practical applications.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Agree</td>
<td>No opinion</td>
<td>Disagree</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>------------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>It is easier to look up which articles apply to a certain region than vice versa.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Looking up an article that belongs to a certain region is easier using the computer program than it is using documents.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To get the end result into the right format it’s better to work with traditional documents.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Reading an article from paper is easier than from the computer program.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Looking up regions to which an article applies is easier using paper then it is using the computer program.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>It is better to view the map on the screen than on paper.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Next up are some questions about the specific function “display on map” which allows searching from text to map.

Could you please name some examples and explain personal work situations wherein the possibility to navigate from text to areas on a map can be useful?

**Example 1**

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**Example 2**

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On the next page there is room for more examples...

Example 3

Who will, in the given examples, be the recipient of the resulting information?

(E.g.: a type of client, companies, institutions, 1.

..........................................................................................................................
Which activities do you still have to perform to present this information to your target audience in the right way?

- Make suitable for a web service
- Insert into a (PowerPoint) presentation
- Insert into a GIS
- Make suitable for a Touch Table
- Insert as an end map into a report (e.g. JPG)
- Other: .............................................

...
Below is a list of 5 functionalities.

1. Simulate the effect of a law or regulation.
2. Compare law 1 against law 2 on a map.
3. Find objects or regions in which law 1 applies.
4. Find a location where through a combination of laws chances for an activity exist.
5. Using a calculation method determine the increased or decreased space of permits after a potential policy change.

Could you please put these in order of importance? 
(for example: 2, 3, 5, 1, 4)

Concluding questions.

During this research you’ve looked up information in two ways.

Which method did you prefer?

Method 1 / Method 2
(Documents) (Computer program)

In the field on the right is room for any remarks you might have.

You may also utilize the backside of this page for this purpose.

Thank you very much for your cooperation.
Appendix [5]

Questionnaire experiment [III]  
in Dutch

Onderzoeksprotocol
12:30 welkom
12:35 Rob Peters legt doel van het protocol en het onderzoek uit:

“Onderstaande tekst vormt onderdeel van het wetenschappelijk onderzoek. Ik lees hem voor in verband met de repliceerbaarheid van dat onderzoek”.

“Het doel van het onderzoek is om uit te vinden of digitale middelen zouden kunnen helpen bij een complex ontwerpvraagstuk zoals dat van het IJmeer/Markermeer. Het is wetenschappelijk onderzoek naar nut en noodzaak van de Watmagwaarkaart. Het is géén onderzoek naar de beste mogelijk inrichting van IJmeer/Markermeer. Het onderzoek duurt 60 minuten. U vult een vragenlijst in gedurende 10 minuten. Daarna geef ik u een demonstratie van een hulpmiddel dat wij willen onderzoeken. Deze demonstratie duurt 20 minuten. Daarna vult u verdere vragenlijst in. De gegevens worden anoniem verwerkt in de analyse. U ontvangt een digitaal exemplaar van het Engelstalige proefschrift. Voor vragen tijdens het invullen kom ik naar u toe. Na afloop loopt u naar de ontwerpsessie dat op 300 meter hier vandaan ligt”.

12:40 uitdelen vragenlijst
12:45 invullen vragenlijst
13:00 start demonstratie platform
13:20 start invullen vragenlijst
13:45 vertrek richting ontwerp sessie
14:00 start ontwerpsessie

1. Researcher shows application platform.
2. Walk Trough demonstration:
3. Klicks to quick scan map
4. Klicks to relevant zoom level
5. Activates bleu map area
6. Explains to audience functionality of blue square
7. Activates looking glass
8. Shows document retrieval
9. Shows petition retrieval
10. Shows upload facility
11. Uploads document with scenario metadata
12. Explains scenario metadata structure as possible way to annotate content
13. Explains role of moderator
14. Explains document metadata structure
15. Goes to main menu
16. Activates vision map
17. Zooms to relevant level
18. Enters a vision
19. Explains functionality of vision upload
20. Moves vision polygon around until already entered plans become visible
21. Retrieves information of such a plan
22. Explains logic of Bleu and Red
23. Explains legal sourcing
24. Activates Open sailing area map by radio button
25. Moves polygon aside the existing plans
26. Uploads document with plan
27. Uploads URL with plan
28. Exists
29. Explains relation with regional plan
30. Goes to main menu
31. Opens Omgevingsplan
32. End of Demonstration

Vragen 0-meting op 7 punts schaal

Goedendag.
U participeert in een onderzoek van de Universiteit van Amsterdam en het Samenwerkings-verband IJmeer Markermeer.
Voor onze analyse hebben we een aantal gegevens van u nodig. Deze gegevens blijven geanonimiseerd.

U bent:
□ Man
□ Vrouw

Uw leeftijd is:
□ 0 jaar
□ 1 jaar
□ 2 jaar
□ 3 jaar
□ 4 jaar
□ 5 jaar
□ 6 jaar
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□ 100 jaar

Uw opleidingsniveau is:
□ MBO
□ HBO
□ WO

U bent hier:
□ Publiek
□ Privaat
□ Particulier
U maakt geregeld gebruik van de volgende technologieën of kanalen:
- Mobiele telefoon
- Laptop
- Pc
- PDA
- Hyves
- Bol.com of Marktplaats.nl
- Linked-in
- TomTom
- 

**Tweede vragenlijst ná de demonstratie**

1 Vindt u het onderwerp IJmeer/Markermeer representatief voor het ontwerpproces van dit soort planningstrajecten over ruimtelijke inrichting in Nederland?

○ zeer eens ○ eens ○ niet relevant ○ oneens ○ zeer oneens

Toelichting (de toelichting van een paar woorden is voor ons van belang voor het juist interpreteren van uw antwoord.)

______________________________________________________________________________________________

2 Vindt u dat in de huidige procedure uw belangen duidelijk voor het voetlicht te krijgen zijn?

○ Zeer eens ○ eens ○ niet relevant ○ oneens ○ zeer oneens

Toelichting

______________________________________________________________________________________________

3 Vindt u dat uw belangen voldoende afgewogen kunnen worden tegen andere belangen?

○ Zeer eens ○ eens ○ niet relevant ○ oneens ○ zeer oneens

Toelichting

______________________________________________________________________________________________

4 Heeft u in voldoende mate zicht op alle juridische randvoorwaarden; of is het voldoende duidelijk welke regeling, waar in welk gebied aangepast moet worden voor de door u voorgestelde verandering?

○ In grote mate ○ in enige mate ○ niet relevant ○ in geringe mate ○ in zeer geringe mate ○ niet

Toelichting

______________________________________________________________________________________________
5 Is de samenhang en de complexiteit van het vraagstuk voor de besluitvorming goed in beeld te brengen?
○ Heel goed ○ goedgebit ○ oniet relevant ○ matig ○ niet goed ○ niet of nauwelijks

Toelichting

6 Is er voor u gemakkelijk zicht te krijgen op de andere relevante discussies in het gebied? En op de wijzigingen in deze discussies?
○ In grote mate ○ in enige mate ○ niet relevant ○ in geringe mate ○ in zeer geringe mate ○ niet

Toelichting

7 In welke mate denkt u invloed uit te kunnen oefenen op de besluitvorming
○ In grote mate ○ in enige mate ○ niet relevant ○ in geringe mate ○ in zeer geringe mate ○ niet

Toelichting

8 In welke mate kunt u zich vinden in de gekozen werkwijze van het ontwerptrject IJmeer/Markermeer
○ In grote mate ○ in enige mate ○ niet relevant ○ in geringe mate ○ in zeer geringe mate ○ niet

Toelichting

9 Kunt u uw achterban goed voorlichten over de technische, economische en ecologische details van de afwegingen. Biedt de huidige procedure genoeg inzicht in de details voor de deelnemers die er niet dagelijks mee werken?
○ In grote mate ○ in enige mate ○ niet relevant ○ in geringe mate ○ in zeer geringe mate ○ niet

Toelichting
10 Er zijn voor- en tegenstanders van transparantie bij complexe besluitvorming in het ruimtelijk planningsproces.

Graag verneem ik van u uw mening over de volgende stellingen:

**transparantie zal de besluitvorming ernstig vertragen**
- zeer eens  ○ eens  ○ enigszins eens  ○ niet relevant  ○ enigszins oneens  ○ oneens  ○ zeer oneens

**transparantie zal het draagvlak versterken**
- zeer eens  ○ eens  ○ enigszins eens  ○ niet relevant  ○ enigszins oneens  ○ oneens  ○ zeer oneens

**transparantie draagt bij tot een beter afgewogen besluit**
- zeer eens  ○ eens  ○ enigszins eens  ○ niet relevant  ○ enigszins oneens  ○ oneens  ○ zeer oneens

**transparantie is een democratische noodzaak**
- zeer eens  ○ eens  ○ enigszins eens  ○ niet relevant  ○ enigszins oneens  ○ oneens  ○ zeer oneens

**transparantie is verstandig aan het eind van onderzoek door experts**
- zeer eens  ○ eens  ○ enigszins eens  ○ niet relevant  ○ enigszins oneens  ○ oneens  ○ zeer oneens

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**Teach-back vragen** om de begrijpelijkheid van de demonstratie te toetsen:

U zag een rood-blauw vlekje bewegen over de kaart. Dit vlekje wordt rood of blauw als de rechtsgrond conflictueert met aanpalende vlekjes van eerder ingebrachte visies.

- correct
- incorrect

De zoekfunctie op tekst is gebaseerd op het omgevingsplan van Flevoland en op het informatiemodel ruimtelijke ordening dat bij bestemmingsplannen hoort.

- correct
- incorrect

De zoekfunctie op kaart geeft weer wat er zich aan documentatie, onderzoeken en discussies in het afgebakende gebied afspeelt.

- correct
- incorrect
1 Denkt u met dit instrument meer invloed uit te kunnen oefenen op de besluitvorming
○ zeer eens ○ eens ○ enigszins eens ○ niet relevant ○ enigszins oneens ○ oneens ○ zeer oneens

Toelichting (de toelichting van een paar woorden is voor ons van belang voor het juist interpreteren van uw antwoord.)
_______________________________________________________________________________________________

2 Vindt u dat met dit instrument uw belangen duidelijker voor het voetlicht te krijgen zouden zijn?
○ Zeer eens ○ eens ○ niet relevant ○ oneens ○ zeer oneens

Toelichting
_______________________________________________________________________________________________

3 Vindt u dat uw belangen met dit instrument beter in de besluitvorming afgewogen kunnen worden tegen andere belangen?
○ Zeer eens ○ eens ○ niet relevant ○ oneens ○ zeer oneens

Toelichting
_______________________________________________________________________________________________

Toelichting

4 Heeft u met dit instrument beter zicht op alle juridische randvoorwaarden; of is het met dit instrument meer duidelijk welke regeling, waar in welk gebied aangepast moet worden voor de door u voorgestelde verandering?
○ In grote mate ○ in enige mate ○ niet relevant ○ in geringe mate ○ in zeer geringe mate ○ niet

Toelichting
_______________________________________________________________________________________________

_______________________________________________________________________________________________

_____________________________________________________________________________________________
5 Is met dit instrument de samenhang en de complexiteit van het vraagstuk voor de besluitvorming beter in beeld te brengen

○ In grote mate ○ enige mate ○ niet relevant ○ in geringe mate ○ in zeer geringe mate ○ niet

Toelichting

6 Is er voor u met instrument gemakkelijker zicht te krijgen op de andere relevante discussies in het gebied? En op de wijzigingen in deze discussies?

○ Veel gemakkelijke ○ gemakkelijker ○ niet relevant ○ niet gemakkelijker ○ niet

Toelichting

7 Kunt u met dit instrument uw achterban beter voorlichten over de technische, economische en ecologische details van de afwegingen. Biedt dit instrument bijvoorbeeld meer inzicht in de details voor de deelnemers die er niet dagelijks mee werken?

○ In grote mate ○ enige mate ○ niet relevant ○ in geringe mate ○ in zeer geringe mate ○ niet

Toelichting

8 Zou het nu getoonde instrument bijdragen aan een zorgvuldige besluitvorming

○ In grote mate ○ enige mate ○ niet relevant ○ in geringe mate ○ in zeer geringe mate ○ niet

Toelichting

9 Zijn dit de functies die u voor de ondersteuning nodig denkt te hebben?

○ In grote mate ○ enige mate ○ niet relevant ○ in geringe mate ○ in zeer geringe mate ○ niet

Toelichting
10 De overheid overweegt het gebruik van digitale kaarten. Helpen deze digitale kaarten in uw ogen meer dan het huidig gebruik van papieren kaarten

○ In grote mate ○ in enige mate ○ niet relevant ○ in geringe mate ○ in zeer geringe mate ○ niet

Toelichting
_____________________________________________________________________________________
_________________________________________________________________

11 Denkt u dat dit instrument meer bijdraagt aan de transparantie van de besluitvorming

○ In grote mate ○ in enige mate ○ niet relevant ○ in geringe mate ○ in zeer geringe mate ○ niet

Toelichting
_____________________________________________________________________________________
_________________________________________________________________

12 Verwacht u met dit soort instrumentarium in Nederland minder snel in de Rechtszaal te belanden?

○ Veel minder snel ○ minder snel ○ niet relevant ○ sneller ○ veel sneller

Toelichting
_____________________________________________________________________________________
_________________________________________________________________

Bent u bereid om per email nog enkele vragen over het onderwerp te beantwoorden in het kader van het onderzoek? De antwoorden blijven anoniem.

○ Ja
○ Nee

Email: ..........................................................
About the author

Rob Peters is currently Chief Information Architect of the Dutch Safety Regions or Vei-
ligheidsregio’s. These agencies include the Firebrigade and they are responsible for inci-
dent- and emergency management in The Netherlands. He studied Business Science
at The University of Groningen and was seduced into the magical world of information
science when James Baty, until recently the Chief architect of Oracle, bought him a copy
of Wired, No1 in Austin Texas, back in 1993. Some months later, Professor Ronald Marlin
Lee, Jim, Clive and Rob organised the first Dutch conference on Electronic Commerce
starring Henry Mintzberg and Dutch pioneers like Roel in het Veld and Ben Verwaayen at
Erasmus University in Rotterdam. Rob received the ‘Indiana Jones award’ from his col-
leagues for the style in which this conference was organised. Proffessor Jo van Nunen, a
pioneer in Electronic data interchange in the Rotterdam Port, stated after this conferen-
ce: “Rob, either you start your PhD now or you leave (and by the way, you are too expensive).”
So Rob left and become founder of Kasteel de Schans, still a well-established new age
training institute in Belgium. But the technology virus kept popping up and in the year
2000 Rob – now a father of a son Roy – joined the lively crew of NetlinQ and Lost Boys
in Amsterdam and became project manager of larger sites such as PortofRotterdam.
com and Overheid.nl. In the meantime Rob was coached into the European research
projects by Frank Wilson and together they received the European Telework Award for
helping Disabled people becoming self-reliant using the internet in 1997. The concept
of IT innovation was still to be developed, but in his experience the real spark had to be
rekindled after the infamous Nina Brink World on line debacle. We – the nerds - had not
changed, but the money seekers did change the world around us. In 2005, re-inspired by
the notion of the Source forges and its meritocratic collaboration models, Rob became
chairman of the Holland Open Software conference for two years. This work carried the
journey from internet innovation to eGovernment innovation. Rob became a techy at
Zenc and a student of Professor Arre Zuurmond. It was also at that time that he decided
to pick up the challenge of Jo van Nunen and Ron Lee to start on his PhD dissertation.
In 2007 Rob coordinated his first larger European project to build an eGovernment Trai-
ning Wiki for eastern European Countries. In 2008 he started to work with the province
of Flevoland on Spatial planning design issues. He received the 'Best paper Award' for the early work that features in this thesis in Prague in 2009. Also in 2009, he left the world of consultants for the newly established Safety Regions and in doing so he became a civil servant himself. His wife and co-founder of Kateel de Schans, Helena decided to follow a different path and new inspiration was needed. In 2011 Euridyce, CIO in Eindhoven and Rob started working on the VERA, the Safety Region Reference architecture. At the same time he transferred his knowledge about maps and semantics to the arena of emergency management. The work on the dissertation under guidance by Prof Tom van Engers continued, however. Rob – now 52 and with his new fiancée Karin – is now in his seventh European research project (about Flooding risk management maps), he is about to organise the 7th international conference, he finished his fourth book and about 30 articles and part of him hopes that after this thesis everything will be quiet for a while. The other part is smarter and knows it will probably not be.