Pursuing Transit-Oriented Development
INTRODUCTION

Junction above Broadway-City Hall SkyTrain station, Vancouver, British Columbia, Canada.
衣食住行

[YĪ SHÍ ZHÙ XÍNG]

A common Chinese proverb stating that the four basic necessities of life are food, clothing, shelter and ability to travel. Origin unknown but widely attributed to Sun Yat Sen.
The deceptively basic needs for shelter and the ability to travel stand at the basis of human evolution and urbanisation. Travelling between our homes and those of family and friends, places of learning or employment, retail locations and of course, leisure destinations, takes up much of our lives. This explains why the planning of cities - spatial organisation of different environments, and mobility - how and by what means we travel; remain fascinating and hotly contested subjects. The type and quality of these places and our movements differ according to the spatial organisation and the mobility provisions of cities and metropolitan regions we find ourselves in.

Imagine as a resident of the Nexus apartment complex in Jandakot, a suburban part of the Perth metropolitan region of Western Australia located about 20 km south of the Perth; you walk the approximate 300 metres to Cockburn Central Station to catch the train on the Mandurah line running on the median the Kwinana Freeway that would take you north to your place of work at the CBD within 20 minutes. As an upwardly mobile young professional, your partner and yourself specifically chose to live here as it was advertised as a ‘transit-oriented development’ and you both did not want the hassle of driving to work and liked having shops and facilities right underneath the apartment block. You were glad when you managed to snatch one of the 32 apartments out of the 40 units launched that opening weekend despite the soaring interest rates (Saunders, 2008). It does not hurt that you can access the beaches at Rockingham or Fremantle with the train as well.

Or consider the Pearl District in Portland, Oregon in the United States, which is a highly desirable mixed-use urban renewal of a rail yard with medium to high density. It is immensely walkable and is served by the privately organised and sponsored streetcar. If you chose to live there, you would have a choice of walking to the cafe at the corner of NW 10th Ave and NW Lovejoy St., conveniently near the dog park at The Fields or hop on the streetcar five locally sponsored stops south to that burger place near Powell’s City of Books right before walking 100 m south to the next block to get coffee at the lobby of the Ace Hotel.

You were swayed by the urbane amenities in the neighbourhood and proximity to downtown but you did wish that your employer Nike Inc. located in Beaverton, a city 11 km south-west of Portland, would reconsider its location and move to South Waterfront as rumoured. Even though it costs only US$2.50, it takes more than an hour to transfer from the streetcar to the Blue MAX line at Galleria/SW 10th Ave MAX Station to Millikan Way MAX Station where you boarded the 62 bus to get to your place of work. The more logical journey, even factoring in your car insurance, road tax and soaring fuel prices; would be to take your car and drive 18 mins (providing
there was no traffic) on the US-26W to cover the 9.6 miles to get to work. Similar stories, some more positive than others, can be traced as well in various metropolitan regions around the world. These trade-offs between desired locations and facilities and the cost of travelling in duration and distance; motivate improvements in spatial organisation.

Human settlements have always clustered around resources or access to other settlements out of necessity. Throughout civilisation, villages and cities were founded along or at the confluence of rivers, trails, roads and eventually railway lines and stations out of pragmatism forming a self-reinforcing cycle as places to be connected to and connection between places increase. Stations and their surrounding areas also occupy an important place in our cultural landscape. These are places of reunions and departures, places of opportunities and interaction as well as places of employment, commerce and inadvertently crime (Bertolini, 2000). Herein lies the basic tenets of the predominantly political desire and pursuit of Transit-Oriented Development (TOD) related to increasing access to resources, reaping the benefits of agglomeration.

Dissertation

TOD is enjoying a renaissance. Planners and policy makers increasingly turning to it as a desired option for development of their cities and regions (Curtis et al., 2009). This research aims to contribute to the academic debate spurred by this resurgence and expand the transport engineering or economics dominated discussion by contributing from an institutional perspectives from within planning. The variety of issues surrounding this research subject requires a broad-spectrum approach borrowing from other social sciences. In this Introduction, the research subject and problem context are defined. The research questions and propositions are presented. An overview of research design and methods is then given followed by a discussion on theoretical and methodological considerations identifying various knowledge gaps, societal relevance and limitations of the research.
TRANSIT-ORIENTED DEVELOPMENT

The contest between practical benefits and idealistic visions has come to shape much of the complexity around the subject of transit-oriented development (TOD). Various definitions of TOD use performance measures such as walkability, density or location-efficiency; mixed in with normative terms such as livability, vitality, accessibility and diversity (Cervero, 1998; Dittmar & Ohland, 2004; Reconnecting America, 2007; Renne, 2008). At the base of these definitions is the consensus that TOD refers to mixed-used residential and commercial developments with sufficient density, preferably graduated, oriented towards and in proximity (walkable) distance to a public transportation node (train, metro, tram or bus) in opposition to a car-dominated and sprawlish urban form.

Increasing and rapid urbanisation is occurring in a world of finite resources (physical space and fossil fuels) unable to perpetually support our current way of living (Newman & Kenworthy, 1999; Tan et al., 2010). Among other solutions, this has led to discussions about more compact and efficient forms of urbanisation and transportation that could contribute positively to social equity and human development (Newman & Kenworthy, 1989). Related to this, the traditionally separated domains of land use zoning and transportation engineering have also paid increasing attention towards integrated land use and transportation planning with an emphasis on sustainable mobility and urban developments (Banister, 2008; Bertolini et al., 2005; Collia & March, 2012; Goldman & Gorham, 2006; Jabareen, 2006).

Sustainable mobility, concerned with the life and travel choices of people, and visions and plans for places; contrasts with the ‘predict-and-provide’ narratives of traditional transport planning (Banister, 2008). This is translated into strategies seeking land-use and transport integration, recognising the importance of the relationship between transportation networks and land-use patterns (Hall, 1994). TODS represent a crystallisation of this relationship. The sheer multitude of opinions, expertise and perspectives of the various social sciences interested in TODS, leads inevitably to varying and oft contradictory discussions and evaluations that question if TODS is sustainable, cost efficient or justified (Bartholomew & Ewing, 2011; Debrezion et al., 2008; Gordon & Richardson, 1997; Jarvis, 2003; Newman & Kenworthy, 1996; 1999; Lund, 2006; Smith & Gihring, 2006). This research is aware of the above discussions on the if and why TODS should be implemented but focuses instead on how TODS can be implemented, if indeed desired, and what elements and conditions play a role in its implementation.
DEFINITION

TRANSIT-ORIENTED DEVELOPMENT (TOD) REFERS TO MIXED-USED RESIDENTIAL AND COMMERCIAL DEVELOPMENTS WITH SUFFICIENT DENSITY (PREFERABLY GRADUATED) THAT IS ORIENTED TOWARDS AND IN CLOSE PROXIMITY (WALKABLE DISTANCE) TO A PUBLIC TRANSPORTATION NODE (TRAIN, METRO, TRAM OR BUS).

TOD, as defined in the box above, is often visually represented as a node or as a set of nodes within a corridors (see Figure 1). A lightly drawn circle of varying radius (some set at half a mile, 800 - 1200 m or more) representing development area, is drawn around an emphasised node or rectangle (representing a train/metro station or a bus-stop) with a line representing (transit) infrastructure running through it. Functions and density of the potential development are captured in this circle against a backdrop of existing urban structure. Zooming out to a regional and metropolitan scale, these circles are threaded by an infrastructure line becoming the recognisable “pearls on a necklace”¹ (Cervero, 1998, pp. 6, 156, 403).
Figure 1: Common visual representations of TOD as node of in a corridor.
The concentration of development around infrastructure is not new (ITS Berkeley, 2012). Conscious planning efforts to improve urban spatial structure to realise normative societal goals are not exactly novel either. One can observe similar strategies reaching back into early planning history. Arturo Soria Y Mata’s Ciudad Lineal proposed in 1882 was an urban plan of parallel sectors with housing concentrated along an infrastructure (public transit and utilities) axis reminiscent of transit corridors (DuPuy, 2008). Likewise, Ebenezer Howard’s Garden Cities from 1898 with settlements of concentric zones of various functions connected by rail and road infrastructure amidst a fabric of consciously spared green and natural landscapes, are conceptual and visual predecessors of current TOD ideas (Hall, 2002). TOD in its more recent form can be attributed to the New Urbanism/Smart Growth wave that sought a different type of urban space than that of the car-dominated suburban sprawl that had come to define much of the North America (Carlton, 2007; Calthorpe, 1993).

The resilience and increasing popularity of the principles behind TOD is also evident in its recurrent usage in various planning strategies and visions around the world. Metropolitan regions and cities recognise the need to manage urban growth, control circulation needs and anticipate societal changes with an integrated approach towards land use and transportation, at both node and corridor level (May & Marsden, 2010; Curtis et al., 2009; Cervero, 1998). The resulting Transit-Oriented Development Strategies (TODS) encompass plans, policies and projects that seek sustainable urban development by “concentrating urban development around stations in order to support transit use, and develop transit systems to connect existing and planned concentrations of development” (Curtis et al., 2009, p. 3).

The rational here is attributed to the desired socio-economic benefits derived from agglomeration, increased accessibility and resource efficiency. Even though there is on-going debate about the actual benefits of TODS, it does not stop proponents from widely promoting the supposed benefits (Chatman, 2013; Debrezion et al., 2008; 2006; Dittmar & Ohland, 2004). Motivations behind the use of TODS can range from practical concerns such as financing infrastructure or development through value-capturing or tax benefits, activation of urban renewal, job creation and pandering to political demands to more abstract goals such as increasing urban vitality, offering alternative mode choices and sustainability concerns (Bertolini et al., 2012; Jacobson & Forsyth, 2008; Lund, 2006; Renne, 2009).
Diagram from Ebenezer Howard’s Garden Cities of Tomorrow (1902) showing activity nodes connected by an inter-municipal railway against a backdrop of green landscape.
TODS, as defined in the box above, are concerned with the way people move, where they work, live and play in their city or region. TODS are therefore context specific by nature. TODS operate against a complex mosaic backdrop of mutually influencing individual choices and lifestyles, market forces and political trends that are coloured by constantly changing socio-cultural forces and determine in part by existing urban structure and regulations unique to each city and region (Wegener & Fürst, 1999). There is a treasure trove of literature that one can easily get lost in exploring what TODS entails, and examining the various reasons for and against it\(^2\). However, the question of how to motivate and implement TODS, if it is accepted that they are indeed appropriate and desired, remains underexposed as a key knowledge gap discussed in this research.
The burden of implementation

Given the many socially desirable benefits claimed by TODS, one wonders why it is not extensively and successfully implemented even when explicitly sought after in planning strategies. Herein lies the burden of implementation. The field of planning has struggled with the realisation of grand visions through exertion of sheer individual will and collective action. Such struggles are not always a bad thing, planning failures such as the Bijlmer social housing project in the Netherlands and assorted ‘disneyfied’ ghost towns in China, amongst others, are good reminders for planners that they should be careful what they wish for. Utility value differs greatly for each individual, not everyone wants to give up their cars and use transit, therefore any resolution of the burden of TODS implementation needs to occur at both the individual and collective level.

Transportation networks and urban structure enjoy and suffer from a symbiotic relationship that results from planning processes playing catch up with technological improvements and societal trends (Hall, 1994). The complexity of the larger social fabric and behaviours also affect and complicate planning processes (Talvitie, 2009). Likewise, the strategic combination of mobility and land use planning is characterised by two dilemmas (Bertolini, 2009). The first being the increasing dependency on mobility and accessibility for social emancipation and economic reasons versus that of the externalisation of the negative effects of environmental costs. The second dilemma results from differences of spatial scales between the unbounded action space of households and companies, and that of the bounded policy action space of land use and transport planning.

Urban planning is caught up between pragmatic efforts to organise and locate persons, businesses and facilities for economic gains and idealism of attempting to create social benefits through the improvement of the urban environment and the human condition. Planning history is full of attempts that proposed to determine the ideal spatial allocation of homes, commerce and utilities (Hall, 2002). The process of urban planning is influenced by societal changes and burdened by its own history as a “concrete social and historical phenomenon” and has increasingly become a political process as well (Scott & Roweis, 1977, p. 1117). Planning decisions resulting in implementation are produced by different individuals with separate, normative and personal views of the world in a complex policy process subjected to various formal and informal institutions. Consequently, these policy decisions are not necessarily based in facts but are mired by beliefs, values and experiences of the individual stakeholders; be they residents, planners or politicians (Hajer, 2005). These outcomes do sometimes occur at the expense of (what others consider) rationality and reality (Kokx & van Kempen, 2010; Wolman & Page, 2002).
These political processes reflect societal tendencies and are simultaneously stumbling blocks and solutions for implementation. The transportation network and especially the public transit infrastructure and services are highly regulated and dependent on extensive public investments in most parts of the world (Brons et al., 2005). These financial commitments and regulations are politicised and at times subjected to heated political debate and public opinion (Bertolini, 2012; Bertolini et al., 2012). The same applies to land use decisions as residents and business owners can be disadvantaged or dissatisfied by policy decisions as materialised in NIMBY movements and various protests.
Collective action is thus needed to achieve broad societal goals. Yet, the resulting change is again dependent on individual choices and beliefs. After all, planning agencies, various authorities, businesses and lobby groups are all constituted by individual planners, policy advisors, owners, employees and activists. Given the introductory understanding of the complex issues at hand, the research needs to be grounded in practice to shape further discussions. The research problem and context are introduced next.
“THE INFERNO OF THE LIVING IS NOT SOMETHING THAT WILL BE; IF THERE IS ONE, IT IS WHAT IS ALREADY HERE. THE INFERNO WHERE WE LIVE EVERY DAY. THAT WE FORM BY BEING TOGETHER. THERE ARE TWO WAYS TO ESCAPE SUFFERING IT. THE FIRST IS EASY FOR MANY: ACCEPT THE INFERNO AND BECOME SUCH A PART OF IT THAT YOU CAN NO LONGER SEE IT. THE SECOND IS RISKY AND DEMANDS CONSTANT VIGILANCE AND APPREHENSION: SEEK AND LEARN TO RECOGNIZE WHO AND WHAT, IN THE MIDST OF INFERNO, ARE NOT INFERNO, THEN MAKE THEM ENDURE. GIVE THEM SPACE.”

ITALO CALVINO, INVISIBLE CITIES (2012, P.156)
RESEARCH PROBLEM AND CONTEXT

This research was funded by a practice and scientific consortium in the Netherlands. The practice members of the consortium are the Province of Gelderland, city regions of Arnhem-Nijmegen and Amsterdam, municipality of Amsterdam, Movares, Nederlandse Spoorwegen (Dutch Railways) and Platform 31 (formerly known as Nicis Institute, an organisation that used a subsidy from the Dutch national government to co-finance scientific research). Together, they represent the planning practice within the Netherlands that were interested in pursuing TOD and yet were equally frustrated by the lack of TODS implementation.

The question set to the academic partners of the University of Amsterdam and the Free University was to unravel TODS in the Netherlands through the lens of economics and the lens of planning, in two separate projects. This planning research project was tasked with finding out how to make TOD happen in the Netherlands by focusing on institutional barriers and incentives in the planning system. This research presented an opportunity to combine planning practice and academia. The research design therefore emphasises the co-creation of knowledge with an iterative learning process characterised by frequent dissemination of knowledge between all parties.

Defining the Problem

TODS have experienced renewed attention in the Netherlands (Bertolini, 2013; Modder, 2013; Rutten, 2011). Neither TOD nor TODS were common in the local planning vocabulary before. The preferred term of choice is Knooppuntontwikkeling. The lack of a Dutch understanding and translation of TOD as a term and a concept is however not an indication that the principles behind TODS were unheard of. The combination of location and transportation policies in the ABC location policy from the late 80s is a well-remembered example, though it is looked upon more favourably by international practitioners than local ones, due to dissatisfactory outcomes (Needham, 2007).

Implementation has however been more reticent. Singular TOD such as the station areas of Amersfoort and ‘s-Hertogenbosch have been claimed as two of the very few successes in the past (Peek & Wilson, 2006; Bruil, 2004), but are not all performing well under the current financial and economic crisis. Comprehensive TODS implemented on a regional or metropolitan scale have also reached an impasse in spite of the abundance of plans and visions (Programmabureau Stedenbaan, 2008; Uitvoerings Alliantie Centrum-en Knooppuntontwikkeling, 2010).
A review of national policy documents of the past six decades revealed that TOD principles have never featured explicitly, except for a brief period around 2000, in spite of and perhaps due to the frequently changing policy goals (Tan, 2009).

Many practitioners and policy makers in the Netherlands are pessimistic about the effectiveness of current land use and transport planning policies despite the abundance of plans that promote sustainable development (Francke, 2010). Increased road congestion, reduced transit use and insignificant emission reduction have been observed (Jorritsma et al., 2010). Despite policy attention towards achieving balance between the different transportation modes, the figures reflect another reality where the car continues to dominate.
The average modal split of the 263 European cities in the EPOMM (2011) database was 24% (walking), 9% (biking), 17% (public transport) and 51% (car). Average modal split from the 26 Dutch cities in the database was 15%, 24%, 9% and 52% (see Table 2). Bicycle mode share is much stronger in Dutch cities, while walking lags behind and public transport share are just dismal in comparison to the European average. In comparison to EU cities with similar population, Amsterdam and Rotterdam were below average in public transport mode share while leading in bike usage (see Table 2). Den Haag was average in public transport use but dominated in bike use. In its league, Utrecht was better than average with public transport but lost out in bike mode share to Münster. The situation in the Netherlands seems therefore more conducive for car and bike use than for walking or public transport. While the above average role that cycling plays is in line with TODS principles, the limited role of public transport and walking next to the still very significant role of car-based travel are at odds with those principles.
Table 2: Comparison of mode share of European cities against cities in the Netherlands

<table>
<thead>
<tr>
<th></th>
<th>AMSTERDAM</th>
<th>ROTTERDAM</th>
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<tbody>
<tr>
<td>Kraków</td>
<td>28%</td>
<td>53%</td>
</tr>
<tr>
<td>Leeds</td>
<td>57%</td>
<td>37%</td>
</tr>
<tr>
<td>Wroclaw</td>
<td>42%</td>
<td>48%</td>
</tr>
<tr>
<td>Thessaloniki</td>
<td>55%</td>
<td>40%</td>
</tr>
<tr>
<td>Frankfurt</td>
<td>34%</td>
<td>40%</td>
</tr>
<tr>
<td>Düsseldorf</td>
<td>40%</td>
<td>28%</td>
</tr>
<tr>
<td><strong>Amsterdam</strong></td>
<td><strong>38%</strong></td>
<td><strong>38%</strong></td>
</tr>
<tr>
<td>Grenoble</td>
<td>61%</td>
<td>57%</td>
</tr>
<tr>
<td>Bordeaux</td>
<td>67%</td>
<td>55%</td>
</tr>
<tr>
<td>Toulouse</td>
<td>75%</td>
<td>42%</td>
</tr>
<tr>
<td>Rouen-Elbeuf</td>
<td>68%</td>
<td>49%</td>
</tr>
</tbody>
</table>

Legend

- Car
- Public Transport
- Bike
- Walking
(Source: TEMS: The EPOMM Modal Split Tool. Database: EPOMM)

*NB: Values of less than 3% are not marked below.*

### DEN HAAG

<table>
<thead>
<tr>
<th>City</th>
<th>Mode Distribution (%)</th>
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<tbody>
<tr>
<td>Gdańsk</td>
<td>35% 35% 28%</td>
</tr>
<tr>
<td>Gothenburg</td>
<td>45% 25% 7% 23%</td>
</tr>
<tr>
<td>Nürnberg</td>
<td>55% 21%</td>
</tr>
<tr>
<td>Edinburgh</td>
<td>47% 18% 21% 14%</td>
</tr>
<tr>
<td>Antwerp</td>
<td>44% 18% 16% 22%</td>
</tr>
<tr>
<td>Den Haag</td>
<td>56% 16% 3% 25%</td>
</tr>
<tr>
<td>Strasbourg</td>
<td>46% 14% 12% 28%</td>
</tr>
<tr>
<td>Nice</td>
<td>43% 14% 23% 20%</td>
</tr>
<tr>
<td>Portsmouth</td>
<td>64% 13% 23%</td>
</tr>
<tr>
<td>Duisburg</td>
<td>38% 10% 38% 16%</td>
</tr>
<tr>
<td>Montpellier</td>
<td>66% 7% 26%</td>
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### Utrecht

<table>
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<tr>
<th>City</th>
<th>Mode Distribution (%)</th>
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<tbody>
<tr>
<td>Leicester</td>
<td>39% 35% 21%</td>
</tr>
<tr>
<td>Venezia</td>
<td>50% 26% 9% 15%</td>
</tr>
<tr>
<td>Nottingham</td>
<td>44% 22% 11% 23%</td>
</tr>
<tr>
<td>Utrecht</td>
<td>45% 19%</td>
</tr>
<tr>
<td>Karlsruhe</td>
<td>41% 16% 23% 20%</td>
</tr>
<tr>
<td>Wiesbaden</td>
<td>46% 16% 19% 20%</td>
</tr>
<tr>
<td>Bonn</td>
<td>47% 12% 8%</td>
</tr>
<tr>
<td>Malmö</td>
<td>48% 11%</td>
</tr>
<tr>
<td>Catania</td>
<td>67% 11% 7% 15%</td>
</tr>
<tr>
<td>Münster</td>
<td>56% 11% 13% 30%</td>
</tr>
<tr>
<td>Aix</td>
<td>64% 8%</td>
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</tbody>
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### NL (Average)

<table>
<thead>
<tr>
<th>Mode Distribution (%)</th>
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<tbody>
<tr>
<td>52% 9% 24% 15%</td>
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### EU (Average)

<table>
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<th>Mode Distribution (%)</th>
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<tr>
<td>51% 17% 9% 24%</td>
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Some practitioners claim overabundance of TODS in the Netherlands. However, if definitions of TOD and TODS are observed, most station locations and surrounding developments in the Netherlands would merely be classified as Transit Adjacent Developments (TAD), where developments are enjoy proximity to transit nodes but corresponding residential or commercial areas are neither attuned to transit use nor accessible by foot, cut off by phenomenological barriers such as major arterial roads or sprawled out Park & Ride terrains (Cervero et al., 2004; Renne, 2009). The experience differs greatly from classic TOD examples, whereby the hub of activity is integrated or located nearer to the station rather than at the edge of the catchment area. Most stations in the Netherlands were built on the outskirts of pre-existing urban centres in the past and their orientation towards the city centre as a place of commerce and urban vitality is usually obscure. Some cities are now seeking to correct this with a ‘red carpet’ treatment for way-finding (Riechelmann-van Asten, 2009).
Many practitioners assign significant blame for the lack of implementation on the complex legal and fiscal instruments, lengthy processes and difficulty of securing private investments (Modder, 2009; Peek, 2008; Programma Ruimte en Mobiliteit, 2006). The abundance of legal, financial and spatial regulations and instruments however imply that conventional solutions are present, if not over-exhausted within the Dutch context. The Dutch planning system seems to have “fallen victim to both institutional and conceptual erosion” (Hajer & Zonneveld, 2000, p. 341). Institutional innovation seems a hard necessity.
The case of the Netherlands

Plans for transit projects and related developments range in the Netherlands from extremely costly high-speed rail station locations to regional transit corridors. They both deal with a complexity of stakeholders, political goals and regulatory instruments. The high profile large-scale urban developments related to the introduction of the high-speed rail have been plague by rising costs, implementation delays and complex public-private partnership (Van der Wouden et al., 2009; Commissie Ruding, 2008). Furthermore, these ‘gateway to the city’ projects (VROM, 2004) are focused on a few single station areas and do not necessary contribute improvements towards achievement of a functional metropolitan TOD network.

Next to these were multi-stakeholders collaborations to direct growth, prior to the financial and real estate market crisis, with TOD principles on a regional corridor. However, the collaborative approach also meant they were hard to enforce. The two foremost examples of these, the Stedenbaan (now StedenbaanPlus) program from the Rotterdam-The Hague metropolitan area and Stadsregionail in Stadsregio Arnhem Nijmegen have yet to see much TODS implementation. They have suffered from rapidly changing organisational dynamics, lack of political commitment and of course, the present real estate depression as a result of structural deficiencies of the market as manifested in less growth or no growth, next to the wider financial and economic crisis (Janssen-Jansen et al., 2012; Programmabureau StedenbaanPlus, 2011; Stadsregio Arnhem Nijmegen, 2007).

Both examples experienced institutional complexities that are part of trying to integrate land use and transport planning (Stead & Geerlings, 2004; Geerlings & Stead, 2003). This all contributes to a less than conducive institutional environment for TODS implementation.

Research question

There is a need to provide an understanding on how to achieve environments conducive to successful implementation of TOD within planning institutions, specifically for the Netherlands. The main research question of this project seeks to understand how TODS implementation can be achieved through institutional change whereby institutional barriers can be overcome through the introduction of institutional incentives in a process characterised by learning and institutional innovation. This is then operationalised in the following sub-questions.
• How to identify the institutional barriers to TODS and their interdependency in a given context i.e., the Netherlands?
• How cases of TODS implementation elsewhere overcome similar barriers and what are the roles that institutional incentives play in this process?
• What processes of institutional change occurred in cases of TODS implementation, what are the specific elements involved, and if and how they are related?
• How does learning facilitate institutional innovation resulting in institutional change, what patterns of learning and markers of institutional innovation can be identified in planning practice, and to what extent does the absorptive capacity of a given planning context affect learning and innovation?
• How can these processes and elements in cases of TODS implementation be transferred towards the Dutch context?

The task at hand is to focus on the institutional aspects that can overcome existing impediments to enable TODS implementation by affecting change in the institutional context. Next, a conceptual model and relevant theoretical concepts structuring this research are examined.
“CRUCIALLY, INSTITUTIONAL CHANGES AND CONSTRAINTS CAN CAUSE CHANGES IN HABITS OF THOUGHT AND BEHAVIOUR. INSTITUTIONS CONSTRAIN OUR BEHAVIOUR AND DEVELOP OUR HABITS IN SPECIFIC WAYS. WHAT DOES HAPPEN IS THAT THE FRAMING, SHIFTING AND CONSTRAINING CAPACITIES OF SOCIAL INSTITUTIONS GIVE RISE TO NEW PERCEPTIONS AND DISPOSITIONS WITHIN INDIVIDUALS”

GEOFFREY M HODGSON (2002, P. 117)
VICIOUS AND VIRTUOUS CYCLES

Various cities and regions are known as ‘successful’ examples of TODS and feature regularly as descriptive case studies that bandy them as ‘best practices’ to learn from. Portland and surrounding areas with its urban development around streetcar lines and the MAX system is a classic TOD example. However, TODS implementation in that metropolitan area, and in other examples, did not happen overnight or through sheer dumb luck. Portland’s TOD evolution is an example of institutional innovation and change through political canny, public support and activism and collective will to create urban quality and embrace multi-modality while preserving precious agricultural land (Arrington, 2009). They were able to overcome a non-conducive environment to TODS implementation shaped by institutional factors such as detrimental financial and planning policies, and a car-dominant culture and non-compact urban structures.

Dunphy et al., (2003) claims that TODS implementation is made possible by policy coordination and integration of the transport and land use planning sectors which requires foresight and involvement of complex stakeholders arrangement to exist. The absence of a clear understanding of this process is an important knowledge gap in literature (Belzer & Autler, 2002; Jopson et al., 2009; Paulley & Pedler, 2000). ‘Best practices’ and case studies are used increasingly but are inadequate for isolating critical factors of the process of evolution and TODS implementation, see definition box below (Brannan et al., 2008).

DEFINITION

IMPLEMENTATION IS CONSIDERED ACHIEVED WHEN THERE IS AN EXPLICIT CHANGE FROM A MORE CAR-ORIENTED TOWARDS A MORE TRANSIT-ORIENTED MOBILITY AT THE METROPOLITAN SCALE AND A MORE COMPACT URBAN FORM ORIENTED TO TRANSIT DUE TO TODS.
Most available accounts are descriptive and highly contextual as TOD is inherently context specific, dependant on highly subjective socio-cultural factors and local contingencies (Pflieger et al., 2009). There are difficulties in the generalisation and transfer of lessons across different contexts (Ison et al., 2011). This is due to the wide range of implementation barriers, context specificity and general resistance to learning across different contexts (Dolowitz & Marsh, 2000; Marsden & Stead, 2011).

TODS implementation is influenced by political processes and societal preferences both positively and negatively. TODS implementation involves a variety and complexity of institutions. Institutions are defined here as man-made boundaries of individual and organisational actions through formal means of legislation, policies and regulations; as well as informal means of norms, values and beliefs (Hodgson, 2002; North, 1995). Formal institutions such as planning legislations and policies, financial regulations and building site restrictions, transportation safety rules and real estate market structures frame the transactions and decisions that govern TODS implementation.

Informal institutions such as attitudes and lifestyle choices, and residential and mobility preferences influence and are also influenced by those formal institutions. These institutions are also changed by and help shape broader socio-cultural norms and values. Institutions are seen as crucial for achieving implementation of sustainable mobility (Clifford et al., 2005; Marsden & May, 2006; May & Marsden, 2010). There is a need to explore and define the role institutions play in sustainable transportation and land use planning (Rietveld & Stough, 2004b; Stough & Rietveld, 1997). The research
focuses on the institutional aspect of TODS implementation - institutions and institutional change, to distill a comprehensive understanding of the process of overcoming implementation barriers.

**Conceptual model and proposition**

In the process of establishing the approach of research, the necessity of diagnosing the problem became apparent. The diagnosis indicated the presence of a vicious cycle of self-reinforcing formal and informal barriers (see Chapter 1). When looking to cases of TODS implementation, a pattern of evolutionary social, political and technological processes (usually over a period of 15-25 years) can be discerned moving away from a vicious cycle towards a virtuous cycle (Cervero, 1998; Curtis et al., 2009; Hull, 2010). This initial analysis (see Chapter 1 for details) led to the following conceptual model illustrated in Figure 3 and the following propositions.

- Cities and regions that experience difficulties and resistance in implementing TODS are in a [1] *vicious cycle* whereby mutually reinforcing formal and informal institutional barriers create a non-conducive environment for TODS implementation. This condition will perpetuate unless there is action taken.
- The introduction of institutional incentives, both formal and informal, targeted to overcome existing barriers creates a [2] *virtuous cycle* that is conducive to TODS implementation.
- This occurs through a process of [3] *institutional change* which is characterised by [4] *learning and institutional innovation*.
- The conceptual model also implies that it is possible to advance, from [1] to [2], but it is also possible to regress, from [2] to [1], as many cities and regions have shown. The process is neither linear or permanent, good choices can definitely be undone by bad habits.

Next, these propositions will be briefly elaborated upon. They are more extensively discussed in the relevant chapters.
Theoretical considerations

[1] Vicious cycle

Barriers to TODS implementation are well examined (Banister, 2004; Curtis & Low, 2012; Rietveld & Stough, 2004a). A review of planning and urban mobility implementation in 25 European cities classified five types of barriers which are legal, financial, political/cultural, institutional/territorial and practical/technological (Clifford et al., 2005). Implementation barriers of the institutional type are regulations and rules applied via policies, financial instruments and organisational culture that impede and obstruct implementation. The integration of land use and transport planning policies crucial to TODS implementation have always suffered implementation barriers, with institutional barriers being the most urgent to be resolved (Marsden & May, 2006).
The identification of barriers are important as only appropriate institutional incentives will lead to the required institutional change. When solutions are not well-matched, this can lead to undesirable, opportunistic and strategic behaviour from stakeholders (Kokx & van Kempen, 2010; Ostrom et al., 1993). Therefore, the point of departure should be the determination of the institutional barriers, both formal and informal, that within a specific context are mutually reinforcing and perpetuating the vicious cycle.
[2] Virtuous cycle

Institutional incentives play a role as feedback signals influencing how individuals within organisation reach a decision that creates a particular outcome through a certain set of rules. They function as levers influencing the course of action and decision by acting as either reward or deterrent (Clark & Wilson, 1961). Individual actors interpret rules differently (Hodgson, 2006). The individual perception of incentives, as well as disincentives working as barriers, are therefore essential (Pierson, 2000; Wolman & Page, 2002).

Institutional incentives are defined here as legal, financial or socio-cultural measures within an institutional field constructed from the inter-relationship between organisations, individual actors and networks that help to overcome the implementation barriers by making a course of action or choice attractive or inspiring to a stakeholder (Lin, 2002; Ostrom et al., 1993; Clark & Wilson, 1961). In transportation and land use planning, there is a lack of understanding in the application of incentives towards implementation through the overcoming of barriers (Banister, 2004). It is therefore important to understand how institutional incentives, both formal and informal, can lead to conducive environments for TODS implementation forming a virtuous cycle.

[3] Institutional change

The institutional change accompanying and resulting from this process of introducing incentives to overcome barriers, moving from a vicious to virtuous cycle, is relatively neglected around TODS implementation and in planning in general. Institutional change is however better explored in discussions in economics, policy transfer, and management and organisational science (Breit & Troja, 2003; Hage & Meeus, 2009). Institutional change could result in something explicit and physical, such as realisation of a TOD neighbourhood and improved public transit infrastructure to support this, but it could take long before anything is visible. Furthermore, the process towards implementation would however be marked by subtle and more obvious shifts in societal attitudes, changes in rules and regulations or even organisational reshuffling that enable physical realisation. These are elements and patterns of institutional change.

Institutional change can be defined when “previous frameworks are challenged and reconstructed, leading to new behaviors and actions.” (Kim, 2011, p. 334). The value in recognising institutional change in planning is to be able to affect it in other contexts through identification of its necessary conditions, if change is indeed desired.
Learning and institutional innovation

“Innovation is an important partner to change. It is the wellspring of social and economic progress, and both a product and a facilitator of the free exchange of ideas that is the lifeblood of progress.” (Poole & Van de Ven, 2004, p. 12). Deliberate institutional change in a desired direction occurs through institutional innovation. Within planning practice, institutions constantly adapt as knowledge acquisition redefines existing boundaries, both from internal and external sources, and eventual application.

Planning practice is an example of tacit-explicit-tacit knowledge exchange (Straatemeier et al., 2010). Much of the knowledge in planning is not able to be captured in its literature due to the complexities of the arenas and forms of practice. Planning practice is also informed by a dynamic larger societal fabric. The individual planner and the planning organisation must have the capacity to learn to be able to innovate. Therefore the identification, facilitation of institutional change through learning and institutional innovation, and the capacity of the planning practice involved are determinant for eventual implementation.

The above concepts and considerations highlight a few important and nested factors that are crucial in the pursuit of TODS implementation, namely;
The influence of the broader socio-cultural and political landscape on planning processes and vice versa.

The importance of subjective perception and beliefs, shaped by those broader landscape trends, contributing to a constructed reality of planning processes that might not necessarily be rational.

The need for well-matched responses to barriers and the need for both solutions and problem to be acknowledged and agreed upon by relevant stakeholders despite subjectivity and potential rationality issues.

The importance of the collective and the individual and their mutual relationship, in planning processes and processes of change and learning. These factors inform the research design and methods which are discussed next.
RESEARCH DESIGN

This research aims to explore how TODS implementation can be achieved through institutional change whereby barriers can be overcome through the introduction of incentives in a process characterised by learning and innovation.

An exploratory approach seeking to discover the processes, the roles and relationship of various elements is required for the operationalisation of the above propositions. The approach is worked out in the following phases, each central to a chapter in this dissertation;

- Phase I: Develop a method for identification of the formal and informal barriers that have resulted in a context not conducive to TODS implementation (the vicious cycle), in particular within the Netherlands
- Phase II: Identification of a virtuous cycle (from appropriate examples elsewhere) conducive to TODS implementation, where self-reinforcing formal and informal institutional incentives play a role in the lifting of barriers similar to the above-mentioned.
- Phase III: Discerning the necessary conditions for institutional change where a shift from a vicious to a virtuous cycle is observed.
- Phase IV: Discovering and enabling the roles that absorptive capacity, learning and institutional innovation play in the processes of institutional change.

Phase V: is to gain insight into the application of the above findings in the Dutch practice context, to aid practitioners (in the Netherlands and beyond) in achieving the desired shift. This could not be completed within the duration of the research as these processes take decades to take place, as observed in examples elsewhere (Cervero, 1998; Curtis et al., 2009). However, an initial step has been attempted through interactive thought-experiment workshops with practitioners. This will be discussed in the Epilogue.
The research design and corresponding methods aim to be attuned to the heuristic process of planning practitioners, particularly those in the Netherlands. For this purpose, the research design utilises the Kolb and Fry (1974) experiential learning cycle where observation and reflection of concrete experiences in other contexts to form abstract concepts which can be tested in new situations.

By engaging perceptions of stakeholders, this research addresses a gap in existing literature, where rationality is often assumed and subjectivity often ignored. Considering the practice-academia interaction and knowledge exchange, and the need for practical applications and solutions, action research is justified. Action research is understood here as research produced with engagement of the practice community, to produce applicable solutions for specific situations. This is built around an understanding of planning research as a design science. Next, the different phases of the research design is positioned relative to the experiential learning cycle.
Figure 4a: Phase I as part of the Kolb and Fry experiential learning cycle, dealing with the identification of barriers.
Phase I: Diagnosis

Phase I deals with the identification of formal and informal barriers, forming a vicious cycle within the Netherlands, that have resulted in a context not conducive to TODS implementation. The importance of the perceptions of stakeholders involved and their acknowledgement of an issue to be resolved are crucial first steps in being able to identify appropriate solutions.

An iterative process involving both deductive and inductive approaches is used. This is achieved through cycles of observation and reflection of involved stakeholders about their concrete experience with TODS implementation (or non-implementation) in the Netherlands (see Figure 4a).

This phase is designed to explore the first proposition regarding a vicious cycle. Chapter 1 examines, if and how, mutually reinforcing formal and informal institutional barriers do indeed occur and create a non-conducive environment for TODS implementation in the Netherlands. This is followed by establishing if and how a vicious cycle is formed, when the above conditions are perpetuated without further actions taken.

As indicated in Figure 4a, the right half of the Kolb and Fry (1974) model is completed.
Figure 4b: Phase II, III & IV as part of the Kolb and Fry experiential learning cycle; dealing with identification of virtuous cycle and the role of incentives, the necessary conditions for institutional change and the roles that absorptive capacity, learning and institutional innovation play in that process.
Phase II, III and IV: Learning from elsewhere

In cases where TODS implementation was achieved through the overcoming of barriers, a shift was made towards a virtuous cycle. A more conducive environment for TODS indicates the completion of the learning process by stakeholders within each respective institutional context, as indicated in the experiential learning cycle (Kolb & Fry, 1974). The individual and collective stakeholders would have had to observe and reflect on concrete experiences (positive and negative) to be able to form abstract concepts regarding possible solutions. They must also be able to test these solutions in new situations leading to concrete experiences that were observed as TODS implementation (see Figure 4b).

Phase II seeks out the above-mentioned cases where TODS implementation was achieved through the introduction of incentives. This is to establish a virtuous cycle in which self-reinforcing formal and informal institutional incentives play a role in the lifting of barriers similar to those identified in Phase I. This is discussed in Chapter 2.

Phase III discerns the necessary conditions of institutional change in these cases where a shift has been observed. Similarities and differences across the cases are explored with a view towards emulation by other contexts that desire equivalent change. This is discussed in Chapter 3.

Phase IV builds upon the findings in phases II and III. The focus here is on discovering the roles that learning and institutional innovation play in the processes of institutional change. In addition, the absorptive capacity enabling these processes are examined. This is discussed in Chapter 4.

Phases II, III and IV allow reconstruction of the process of institutional change and identifies possible initial steps towards a similar process of learning, innovation and change for other contexts. This can be the starting point for completing the left half of the model, i.e., testing in new situations that is the Netherlands as the next phase.
Figure 4c: Phase V as part of the Kolb and Fry experiential learning cycle, dealing with application towards the Dutch context.
Phase V: Testing lessons learnt

Phase V is conducted to gain insight into the application of findings from the above phases in another context, i.e., the Dutch practice context.

This is to aid practitioners (in the Netherlands and beyond) in achieving the desired shift. Here, abstract concepts are formed from the observation and reflection of concrete experiences from foreign cases for testing in new situation, the Netherlands (see Figure 4c).

It was of course not possible to test this in the realities of planning practice. Yet, a first step towards such a test has been made through an iterative process with the practitioners. The twin purpose of this phase is the testing of potential application of incentives learned elsewhere within the Dutch planning practice and determine the learning capacity of its practitioners.

The findings of this phase, as mentioned above can only be seen as the first step towards testing, will be discussed in the Epilogue.
RESEARCH METHODS

Phase I: Identifying barriers

Phase I starts with an extensive literature review on TODS implementation and impediments. Concurrent analysis of Dutch planning policy documents relating to land use and transport integration from the past six decades to deduce and identify barriers to TODS implementation in the Netherlands. This is further explored through open interviews with relevant stakeholders about their experiences with TODS implementation until theoretical saturation is reached. Interviewees are selected according to i) scale - national, regional, urban agglomeration or local, ii) sector - land use or transport or both, and iii) type - public or private or other. The identification of crucial barriers is then validated in two focus groups that polled practitioners on what was for them the most crucial barrier. This was followed by parallel discussion sessions to disentangle the argumentations behind individual assessments, and compare and combine the different argumentations. This research method is explained further in Chapter 1.

Phase II, III & IV: Selecting a virtuous cycle to learn from

Learning from elsewhere is crucial for two reasons; in cases where the shift has yet to occur, there is little to no examples to learn from and therefore inspiration from another context is needed. Case studies (from elsewhere), where vicious cycles became virtuous cycles, are therefore necessary for Phase II, III and IV. The line of inquiry lends itself to using a multiple-case study design in which both the how and, more importantly, the why of TODS implementation can be captured across multiple cases and evaluated in a cross-comparison (Bryman, 2004; Yin, 2003). A replicated case study across multiple cases provides robustness that satisfies external validity. Case studies also lend an opportunity to delve deep into foreign institutional context to isolate opportunities for learning and transfer. However, before conducting the case studies, the following issues of context specificity, selection and data collection protocol have to be addressed.

Resistance to learning from different contexts

Due to the context specificity of this research subject, resistance by practitioners and policy makers towards the acceptance and adoption of measures deemed too different or extreme can be expected. This was experienced within the research consortium, requiring a need for a more systematic selection process. Resistance is increased when the learning process challenges core beliefs of the policy system and indirectly its
instruments and mechanisms (Wolsink, 2003). To tackle these issues towards learning, Spaans and Louw (2009) framework\textsuperscript{8} was combined with Wolsink’s (2003) contribution (see Table 5).

Table 5: (Adapted) Framework on likelihood of transfer between same, similar and different systems (barriers and context) (Spaans & Louw, 2009) by adding the factor of resistance (Wolsink, 2003).

<table>
<thead>
<tr>
<th>Knowledge transfer between:</th>
<th>Same barriers and context</th>
<th>Similar barriers but different context</th>
<th>Different barriers and different context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspiration</td>
<td>Less likely</td>
<td>Very likely</td>
<td></td>
</tr>
<tr>
<td>Learning</td>
<td>Least resistance</td>
<td>Ideal environment for learning</td>
<td>Most resistance</td>
</tr>
<tr>
<td></td>
<td>Least learning</td>
<td></td>
<td>Most Learning</td>
</tr>
<tr>
<td>Transplantation</td>
<td>Very likely</td>
<td>Less likely</td>
<td></td>
</tr>
</tbody>
</table>

The opportunity for inspiration is more likely to occur between countries with different planning systems and models while transplantation opportunities are more likely within the same system when it concerns knowledge transfer between two contexts. The ideal environment for knowledge transfer seems to be the middle ground between learning and resistance (see Table 5). Ideal examples for knowledge transfers are therefore those that are from different contexts that share and overcame similar barriers faced in the context where knowledge transfer is sought.
Case Selection

Here, a conscious choice was made not to fixate on the conventional encumbrance of case study design such as scale, size, density and physical attributes. TODS are highly context dependent and a major source of concern was how to strip away the veneer of geographical, political, and social-cultural contextual trappings to discover the recurrent underlying patterns of how TODS happened in all these cases. Those underlying patterns were the most relevant lesson to learn. In addition, any selection based on physical attributes would only invite further disagreement from practitioners as most viewed the Netherlands as being too unique (in size, density, urban structure, culture and planning system) and other cases as being too different and therefore difficult to learn from.

The unit of analysis is a regional system of transit infrastructure with corresponding TOD projects within a metropolitan area. This correspond to the contexts of the various cities and regions attached to the consortium. This means the use of embedded cases (multiple projects) within a particular context to ensure the internal validity of the research by allowing for possible rival explanations or alternative patterns.

The next move is to determine who and where to learn from. For knowledge transfer, the path of least resistance is preferred (see Table 5). Critical cases with positive learning opportunities are therefore best suited for this research. A two-step approach to case selection was applied, consisting of an initial quick scan followed by a final case selection according to variables in institutional arrangements ensuring construct validity.

This approach is explained in greater detail in Chapter 2, 3, and 4. In the quick scan, an initial pool of potential cases culled from literature must suffice the criteria of i) an observable modal shift and changes in real estate values and developmental patterns towards TODS, ii) have experienced similar barriers to those identified in the Netherlands which were overcome through explicit interventions. A total of 26 potential cases fulfilled these criteria.
On further examination, these potential cases exhibited five ideal types of stakeholders - i) planning authorities, ii) transportation authorities, iii) transit agencies/service providers, iv) private developers/interests and v) knowledge/advocacy institutes from local, urban agglomeration, regional and national levels of scale. Four common combinations of institutional arrangements between these ideal stakeholders types were found from the 26 potential cases;

- **I/I* Planning Authority + Transit Agency/Advocacy*: Planning Authority and Transit Agencies are active parties. Incentives used are mostly formal but technically creative. Formal incentives used with advocacy groups as a common subset. Potential cases: Boston, Denver, Houston, Miami Dade, New Jersey, Portland, Chicago and San Francisco.

- **II Transit Agency + Private Developer**: Transit Agency and Private Developers are active parties and incentives used can be a mix of formal and informal regulations. Transit Agencies in these type are highly entrepreneurial and profitable. Potential cases: Dallas, San Diego, Vancouver, Washington, Hong Kong, Singapore and Tokyo.

- **III Planning Authority**: Planning Authority is highly active and use Strategic Planning Frameworks to enact regulations. Potential cases: St. Louis, Brisbane, Melbourne, Perth, Sydney and Naples.

- **IV Planning Authority + Transit Authority**: Planning and Transit Authority are strongly active and clearly hierarchical, favouring formal and long term regulations. Potential cases: Copenhagen, Stockholm, Karlsruhe, Munich and Zurich.

One case per combination was chosen. Considering pragmatic constraints such as language and access to information and knowledge networks, the metropolitan regions of Portland, Vancouver, Perth and Copenhagen were finally selected.

**Data collection**

The protocol for data collection and analysis replicated for the four case studies ensured reliability and external validity. Likewise, more detail about the process can be found in Chapters 2, 3 and 4. The four cases were visited in person for a field work period of 4 - 6 weeks on average. The data collection process precedes actual field work. Once on site, the fieldwork is started with a field trip to diverse TOD projects with at least 1 local expert as a guide. The data sought and collected are from as many diverse sources as possible, such as policy documents, press releases, reports, internal communications, semi-structured interviews with key stakeholders and experts, and focus groups or workshops (whenever possible).
These data were sorted into three lines of narratives\textsuperscript{10} which were then triangulated to ensure internal validity;

- **Context narrative:** Overview of exogenous events and factors that might be directly or indirectly related to the understanding of an evolution towards TODS implementation. Information such as economic conditions, changing political leadership and factsheets of the TOD projects planned and realised were collected. To create a wider institutional and socio-cultural context, forms of media (newspapers, broadcasting, blogs, websites and forums) were also consulted.

- **Timeline narrative:** Chronological reconstruction of Projects, Plans/Programs/Policies and Organisations in the context of Trends/Events in the past (generally 15-25 years, can stretch a few decades on either side depending on related information from interviews) combined with modal shift data isolate the critical phases. Detailed data on policies and organisations were collected from official websites, and statistical and annual reports. Information was found in archives, statistical yearbooks, annual reports or financial reports as well as academic literature, news archive, other media forms and personal websites.

- **Interview narrative:** The individual and collective perspectives of local experts and stakeholders feature in this narrative with a line of inquiry on barriers and institutional incentives, their learning process and how they benchmark their region’s successes\textsuperscript{11}. The interviews are semi-structured, recorded, transcripted and kept anonymous so that the local experts are free to share their knowledge. Interviews are generally one-to-one, however, concessions have been made for individuals with time constraints. Interviewees were found through prior literature review of key policy documents and recommendation from the researcher’s network\textsuperscript{12}. Interviewees are selected by the same scale, sector and type categories as used in Phase I. Interviewees received the same interview requests, customised per case. The interviewee is free to share any information and experiences. The researcher only employs minimal verbal prompts to ensure sufficient coverage of topic without external influence.
Phase V: Preparing to test

Three focus groups were planned with practitioners from the consortium and their colleagues\textsuperscript{13} to test potential application of incentives learned elsewhere and examine the learning capacity of the practitioners. This is conducted through a two-step approach to establish the ability and potential to apply lessons from abroad as determined by the capacity to learn for those involved. The sample population was selected from practitioners involved in the research consortium, their colleagues and extended network. These participants should be involved with TODS in their professional capacity. Each focus group included participants from various levels of scale (national, provincial/regional, urban agglomeration, local), sector (land use and/or transport planning) and type (private or public) when availability allowed.

This is the first step of determining the participants’ peer group learning process through a thought experiment in a focus group setting. Participants were given a list of incentives found in all foreign cases beforehand, informed about the local context or ‘problem’ of the hosting organisation. They were then separated into two parallel focus groups and asked to resolve the issues raised with the given incentives as inspiration.

The second step determines the individual absorptive capacity of the participants. Participants are asked to fill in a survey after the thought experiment session on their professional experiences, education background, and affinity with TODS planning processes. In addition, they are asked to reflect on the solutions achieved, if they agreed with the group’s solution and which incentive they personally preferred. The method and findings will be discussed in detail in Epilogue.
STRUCTURE

This dissertation is structured around the conceptual model of vicious and virtuous cycles for TODS implementation, the resulting propositions and the corresponding phases of research design and their methods (see Figure 3). The propositions are formulated and operationalised and tested in the following chapters.

Chapter 1 - 4 are articles submitted to or accepted by international peer-reviewed journals that correspond to the propositions, see boxes below, and dissect those dynamics presented in the conceptual model by examining and testing them with empirical findings from the four phases of research design. Each chapter can therefore be read independently with its own introduction, findings, and conclusions. The Epilogue is appended to round off discussions on the propositions within this research and to accommodate some initial findings and discussions from the fifth and last research design phase.
Chapter 1, submitted and currently under review, establishes that TODs implementation remains challenging due to institutional barriers, which previous research have indicated as most crucial. Empirical findings from the Netherlands, culled from an inductive and deductive process using literature review, policy analysis, open interviews with QDAS coding, survey and focus groups; are applied. The identification of crucial barriers establishes that formal and informal institutional barriers reinforce one another in a vicious cycle whereby the institutional environment is not conducive to TODS implementation. Literature provides general lessons on coping with these political, legal, financial and organizational barriers. Yet, application to a different context is complicated, as barriers are context-specific and interrelated. Understanding the relationship between institutional barriers and their context-specificity are therefore prerequisites for TODS implementation. The case of the Netherlands is representative of observations elsewhere and barrier identification is a crucial first step for cities and regions that pursue TODS but experience implementation obstacles.

PROPOSITION [1]:
CITIES AND REGIONS THAT EXPERIENCE DIFFICULTIES AND RESISTANCE IN IMPLEMENTING TODS ARE IN [1] A VICIOUS CYCLE WHEREBY MUTUALLY REINFORCING FORMAL AND INFORMAL INSTITUTIONAL BARRIERS CREATE A NON-CONDUCIVE ENVIRONMENT FOR TODS IMPLEMENTATION. THIS CONDITION WILL PERPETUATE UNLESS THERE IS ACTION TAKEN.
Chapter 2, published in Urban Policy and Research, examines the ingredients of a shift towards a conducive environment for TODS and studies how that change occurs through the introduction of incentives to overcome implementation barriers. The relationship between formal and informal barriers and a virtuous cycle of mutually reinforcing formal and informal incentives lifting of those barriers is applied to the examination of three metropolitan regions; Perth, Portland and Greater Vancouver. These cases served as theory confirming cases. A combination of literature review, policy analysis, semi-structured interviews and timeline reconstruction generates empirical findings for applying the conceptual model. Findings reveal several combinations of incentives being used in those cases that can inform those wishing to pursue TODS implementation.

PROPOSITIONS [2]:
THE INTRODUCTION OF INSTITUTIONAL INCENTIVES, BOTH FORMAL AND INFORMAL, TARGETED TO OVERCOME EXISTING BARRIERS CREATES A [2] VIRTUOUS CYCLE THAT IS CONDUCIVE TO TODS IMPLEMENTATION.
Chapter 3, submitted and currently under review, examines the process of moving from a non-conducive to a conducive institutional context for TODS by proposing a theoretical framework to analyse processes of institutional change through its elements of critical phases resulting from catalysts, corresponding reactions and effects. The theoretical framework defines institutional change and grounds it in planning practice adding the consideration that the processes are iterative across a time. Four cases of TODS implementation in the metropolitan regions of Perth, Portland, Vancouver and Copenhagen; are examined with the corresponding conceptual model. This model is subsequently refined. Elements and patterns of occurrence of institutional change are identified, concluding with the necessary conditions that can inform policy makers and planners, if change towards TODS implementation is indeed desired.

Chapter 4, submitted and currently under review, explores and establishes the role of learning and institutional innovation in the processes of institutional change towards TODS implementation. A theoretical framework is proposed that resolves the abstract and cursorily used concepts of learning and institutional innovation by grounding both concepts in practice and empirical data from the four cases. This framework is tested on these cases and findings result from the comparative analysis. These are the metropolitan regions of Perth, Portland, Vancouver and Copenhagen which have made the shift towards TODS implementation. Findings include observation of markers of institutional innovation as deliberate and positive changes and the collective and individual absorptive capacity present. These occur through new practices and meanings facilitated by patterns of learning from the creation and improvement of existing knowledge through social and knowledge networks. The chapter concludes with recommendations for planners and policy makers and further research steps.
The Epilogue addresses the research questions posed with the findings from the previous chapters and reflects back on the relevance and limitations of this research design and its methods. In addition, Practice and Academia, a discussion chronicling the process of research and the involvement of the practice community in the Netherlands is appended. Concerns and discussions on the action research process are shared. Initial results from focus groups and workshops from Phase V of the research design are discussed. In addition, observations on the progress of the pursuit of TODS in the Netherlands are made. Reflections include the state of professional competency, learning capacity and group dynamics of the planning practice community regarding TODS.

**PROPOSITIONS [1] VICIOUS CYCLE & [2] VIRTUOUS CYCLE:**

The conceptual model also implies that it is possible to advance, from [1] to [2], but it is also possible to regress, from [2] to [1], as many cities and regions have shown. The process is neither linear or permanent. Good choices can definitely be undone by bad habits.
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NOTES

1 This can vary as ‘beads on a string’ or ‘pearls on a string’ as well.
2 A simple Google Scholar™ scholarly texts search for “transit-oriented development” shows 9,460 articles while with that exact phrase while a Google Books™ service search throws up 26,600 results as of July 2013.
3 NS or Nederlandse Spoorwegen, the Dutch Railways is the primary passenger rail transport provider in the Netherlands. It operates passenger and freight services as well as business operations in real estate in and around the stations.
4 The economics project at the Free University focused on the market value of TODS.
5 Nodal developments. Knooppunt is translated as node (junctions or nodes of highway, roads, bicycle paths and more popularly transit infrastructure). Ontwikkeling means development and growth.
6 Refer to Appendix: LIST OF INTERVIEWEES and INTERVIEW REQUEST (NL).
7 Refer to Appendix: MEETINGS.
9 Refer to Appendix: CASE SELECTION, Table A.
10 For examples and more details on all three narratives, please see http://niciskei.wordpress.com/ipvko-foreign-cases/case-study-reports/.
11 Refer to Appendix: INTERVIEW REQUEST (FOREIGN CASES).
12 Refer to Appendix: NETWORK.
13 Refer to Appendix: MEETINGS.