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Andrew Switzer, Luca Bertolini and John Grin

# Understanding transitions in the regional transport and land-use system: Munich 1945–2013

The broadly advocated coordination between transport and land-use planning is being hindered by barriers nested in persistent societal structures and intertwined practices. In order to understand how such barriers can be overcome, we use insights from transition studies to develop hypotheses with regard to why and how transitions in transport and land-use planning take place through an imbedded case study of transitions in the region of Munich from the period of 1945–2013. Of importance are changes in the practices of households and firms, attention from interest groups, institutions allowing for conflict but also being supportive of conflict resolution and the identity of the city as a powerful discursive element in urban transitions.

**Keywords:** transport land-use, transitions, multi-level perspective, historical, urban region, Munich

## Introduction

In practice and research there has been considerable attention on the coordination between transport and land-use planning, modal integration and the need for steps to be taken to realise both (Banister, 2008; Cervero, 1998; Curtis et al., 2009; May and Marsden, 2010). However, the ensuing issue of how to tackle the obdurate problems that arise in attempts to radically adapt both existing planning and development practices and the structures in which they are embedded is still unsolved (see Banister, 2008; Bertolini et al., 2008; May and Marsden, 2010; Tan, 2013). In the area of transition studies this type of radical change in structures and practices has been the focus of much research (see Geels and Schot, 2007; 2010; Grin, 2010; Rotmans and Loorbach, 2010). There, mobility has increasingly become the subject of study (e.g. Geels et al., 2012). However, transitions in systems in which space and the urban environment in particular, are the object of study remain virgin territory (Næss and Vogel, 2012). We argue that transport and land-use planning research should devote more attention to how radical change takes place and that urban space in transitions has not been adequately conceptualised and researched.

To address these shortcomings, Switzer et al. (2013) have developed a heuristic framework of transitions in the regional transport and land-use system. In this paper we apply their framework to address the question of why and how transitions in the

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transport and land-use system at the level of the city region take place and empirically develop hypotheses. In the next section we give an overview of the framework which is supplemented in order to enable it to examine historic transitions. The framework is used to evaluate an embedded case study of historic transitions in the regional transport and land-use system of Munich, a city region where transition towards coordination between transport and land-use planning and transport planning, as well as modal integration has taken place.

### **Transitions in the regional transport and land-use system**

Switzer et al.'s (2013) heuristic framework (Figure 1) integrates the transport land-use feedback cycle (Wegener and Fürst, 1999; Bertolini, 2012) and the multi-level perspective (MLP) of transitions (Geels and Schot, 2007). Three levels of the MLP can be distinguished:

- landscape: long-term exogenous trends such as macro political and economic developments, deep cultural trends as well as demographic change and general technological progress;
- regime: the dominant configuration of the system in an urban region which is composed of practices and structures characterised by coevolution and thus obdurate in nature;
- novelties: also composed of practices and structures, but in contrast to the regime these are marginal and instable, requiring continuous effort from novelty actors to maintain them.

Embedded in the MLP is the logic of the transport land-use feedback cycle (Wegener and Fürst, 1999; Bertolini, 2012): changes in the patterns of land-use co-determine changes in location and travel choices of households and firms, which in their turn build up pressure for change of the transportation network; change in the latter influences the relative accessibility of locations, which in turn is a factor in land-use change.

#### **Transition dynamics**

Switzer et al. (2013) address the criticism of the MLP that there is not enough attention for agency in structural change (Meadowcroft, 2007; Shove and Walker, 2007; Smith et al., 2005) by emphasising that reflexive actions of individual competent actors are essential for transition. In the transport and land-use system these competent actors are policy makers, property developers, transport implementation agencies and interest groups (e.g. businesses, scientists and activists) with respect to mobility and spatial policies, and individual firms and households with respect to mobility and spatial practices. These actors draw on existing structures, but can actively and reflexively seize developments at one level and connect them to change at another level,

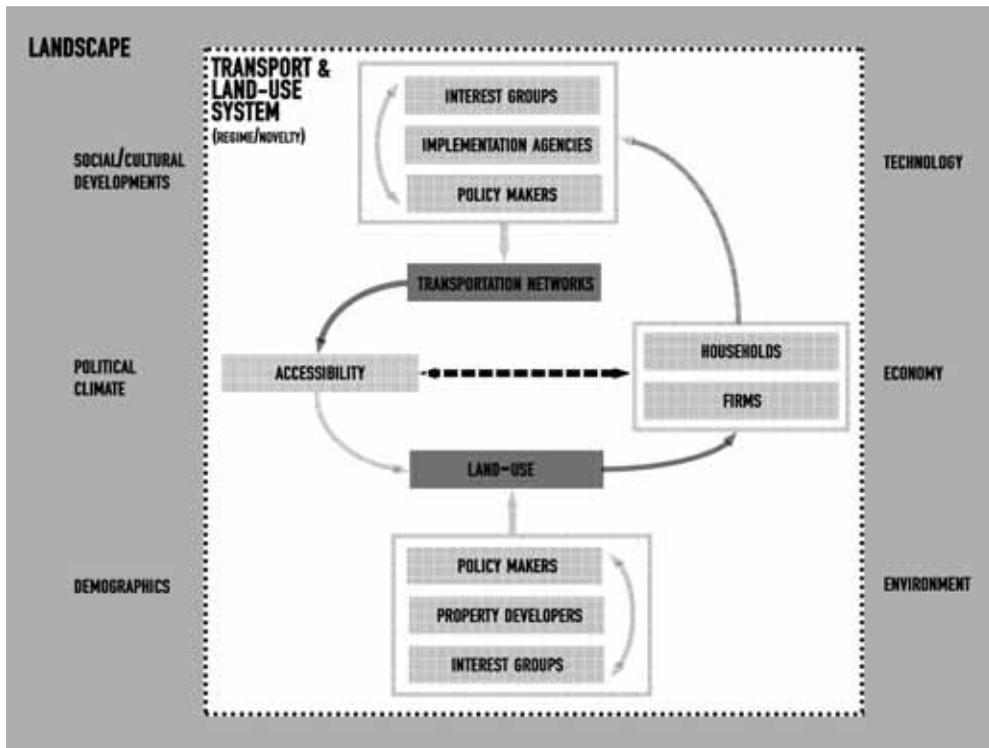


Figure 1 Heuristic framework for transition in the transport and land-use system

thus bringing about mutual reinforcement between dynamics at the different levels (Grin, 2006; 2010, 274–75; Smith, 2007). An example is the demand for changes in the travel patterns (e.g. from car to public transport or biking) as a result of a growing environmental awareness in society as a whole. The double-ended arrows symbolise interaction between actors. This can take a number of forms such as exertion of power (e.g. political or economic), lobbying (e.g. a property developer lobbying a policy maker to be able to develop in a certain location or with higher densities), exchange of resources (e.g. financial resources, political support and knowledge). The single-ended arrows show signals to other actors as in the traditional transport and land-use feedback cycle or interventions in the artefacts (e.g. the construction of buildings or infrastructure).

Following Geels and Schot (2010), we see structure in the transport and land-use system as constituted by rules, and to add to this discourses (Grin, 2010; Hajer and Versteeg, 2005) and artefacts (as in the transport land-use feedback cycle: Wegener and Fürst, 1999; Bertolini, 2012):

- Normative rules: tasks, obligations, responsibilities as well as behavioural rules and societal roles (e.g. social and organisational capital; vested interests, lifestyles and financial incentives);
- Cognitive rules: belief systems, problem agendas and search heuristics that are taken for granted and used unconsciously;
- Regulative rules: laws and regulations, contracts with formal sanctions for non-compliance;
- Discourses: an ensemble of ideas, concepts and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through an identifiable set of practices; and,
- Artefacts: the physical components of the transport and land-use system (transport networks, patterns of land-use).

The intertwined nature of the forms of structure means that changes in a rule, artefact or discourse (taking on a new procedure, applying a new search heuristic, adding infrastructure or changing the discourse regarding urban development) can be hindered or expedited by the various forms of structure.

A transition generally lasts 40 to 50 years (Kemp et al., 2012) and is characterised by several phases: (i) pre-development (dynamic equilibrium in which the status-quo changes at the background); (ii) take-off (increasing momentum of structural change); (iii) acceleration (structural change becomes visible) and (iv) stabilisation (a new equilibrium is reached) (Grin et al., 2010, 5). At moments in which developments at one or more levels reinforce each other (positive feedback) rapid change can be observed, whereas a negative feedback can hinder change (Rotmans and Loorbach, 2010, 129–131; see also Geels, 2011). Transitions are not clear-cut and may overlap.

## Methodology

To address the question of why and how transitions in the transport and land-use system take place, a multiple embedded case study (see Yin, 2009, 59) in the transport and land-use system of Munich since 1945 has been carried out. We consider a transition to be change within the socio-technical system by which dominant structures and practices are modified as a result of co-evolution of regime, novelties and landscape.

## Cases

The point of departure for the analysis is the expectation that a radical change in practices of households corresponds with change in other parts of the socio-technical system, and thus a transition. Based on the analysis of available information about radical changes in practices of households in Munich we can distinguish three possible periods of transition. In particular, the ellipses shown in Figure 2 indicate possible

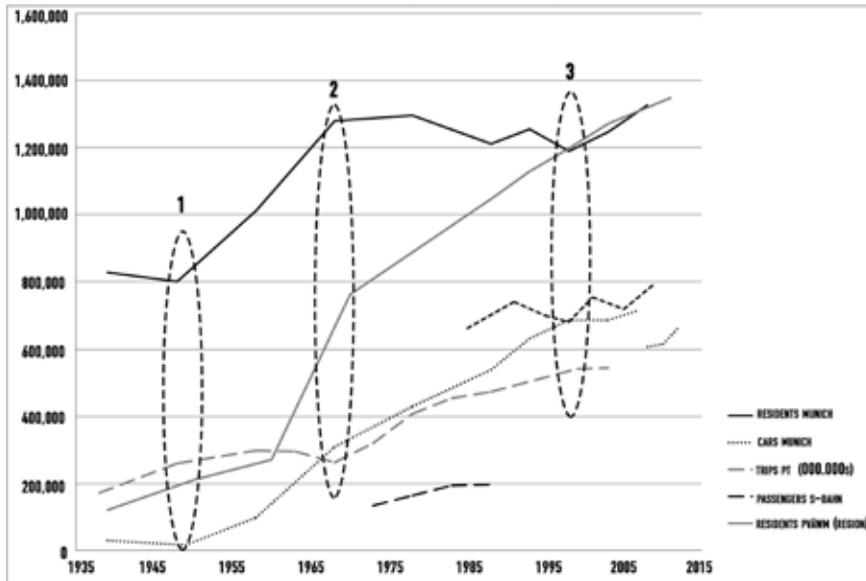


Figure 2  
Periods of transition  
in Munich  
1945–  
2013

**Table 1** Changes in practices of firms and households during the three periods of transition

	Transition 1 (1945–1970)	Transition 2 (1970–1995)	Transition 3 (1995–present)
<b>Households</b>	Stabilisation ridership public transport Dramatic increase car ownership increase commuting to Munich 60% increase residents in Munich and in region	Increase car ownership and ridership as well as commuting – share to Munich decreases Decrease residents Munich (+/-10%) Growth in region, especially in S-Bahn municipalities	Stabilisation ridership/ car ownership Growth of cycling – 17% Share commuters to Munich decreases further (33%) Population growth Munich (age group 25–29 and in districts at the edge and surrounding the centre) and especially non-S-Bahn municipalities
<b>Firms</b>	Settlement of large firms 140,000 new jobs until 1961	Strong growth of service sector Regionalisation of employment	Continued regionalisation of employment, primarily near the city (60% in Munich) Importance's of high-tech and services increases
<b>Source</b>	LA München (1963, 4, 7) Bätzing (2013)	Bätzing (2013) Guth e.a. (2010) PÄWM (2010, 4, 5, 13, 26)	Guth e.a. (2010) PÄWM (2010, 4, 5, 11) Empirica (2005, 2011) Maute (1994, 164–167) Kürbis (2012) LH München (2011b)

phases of take-off and acceleration of a transition and were used to focus the detailed analyses as discussed below. The changes that took place are further elaborated in Table 1. The delineation is not clear-cut as the inertia of the development of artefacts means that it is possible that the landscape, discourses and some rules could be in pre-development of a following transition, while artefacts are being adapted conform the rules of the earlier transition.

### Method of analysis

Based on the recognition that structural change is the result of pressure on practices (Geels and Schot, 2010) and the resulting debate and conflict, we focus the analysis on ‘troubles’ (as defined by Wright Mills, 1959): difficulties encountered by individuals in their day-to-day practices, partly as a consequence of contested attempts to deal with the issues of their time. The troubles were identified by writing up a complete case study report of the period 1945–2011 (reaching further back to capture the pre-development phase of the first transition) based firstly on interviews (respondents listed in appendix A and indicated with a four letter code in the text) and historical analyses cited in the text and supplemented by primary sources. Triangulating as such also contributes to the internal validity or credibility (Bryman, 2008, 377). In selecting respondents we used the framework of Switzer et al. (2013) to ensure that respondents representing the various most relevant types of actors were interviewed. In this sense our sampling was theoretical (Bryman, 2008, 414). However, the selection of respondents resembles the snowball method (Bryman, 2008, 148) whereby respondents, including researchers, were asked to indicate other relevant respondents followed by a description focused on the trouble. This included how the troubles arose as a result of the interaction between novelty, regime and landscape and finally how actors changed or attempted to change structures to address the underlying issues. Based on the descriptions of the three periods of transition, hypotheses were developed about why and how transitions take place in the regional transport and land-use system.

### Transition 1

Munich, from 1945 until the mid 1960s changed as shown in the second column in Table 2. In this period we see two central troubles, firstly a shortage of space with the discussion focusing on how space could be (re)allocated to which functions and secondly traffic congestion leading to a discussion regarding the allocation of road space.

**Table 2 State of the system at the end of each transition**

Parts of Framework	End Transition 1	End Transition 2	Transition 3 2012
Interest groups	Space for car Address traffic chaos	Road construction too radical + car needed Role for public in planning process Retention tram	Support biking Regionalisation public transport
Implementation agencies	Public transport underground	Retention tram + extension U-Bahn	Tram + S-Bahn
Transport policy makers	Car essential/circulation important Create space for the car Public transport underground	Public transport before car Multimodal public transport Expansion road network	Space for bicycle Investments in public transport
Transportation networks	Ring and radial roads S-Bahn/U-Bahn	Expansion U-Bahn + retention tram Road construction continues	Expansion bicycle network + public transport in the city
Households	Rapid growth Increase car ownership Stabilisation PT use	Regionalisation Slower incr. car ownership PT use increases	Growth in city and region Commuting polycentric Incr. bicycling in city
Firms	Rapid recovery Relocation of firms from east	Growth (technology + services) Limited decentralisation	Growth in region, high tech and services
Land-use	Separation of functions Expansion centre/city	Smaller scale interventions Retention & demolition historic	Housing in central city and in region
Land-use policy makers	Combination of historic and modern Development of housing at edge of city	Polycentricity & liveability	Intensification around public transport
Property developers	High-rise housing and businesses in centre	Renewal city Expansion centre	
Interest groups	Modernise/retain of historic centre	Protection of character of city	Regional cooperation necessary

Note: the items in the rows refer to the elements in Figure 1

### Trouble: shortage of space

In terms of land-use planning the central trouble was a shortage of space resulting from the interaction between existing spatial structure and landscape changes, namely considerable population increases supported by economic restructuring leading to employment growth in cities. This stability was due to the location of Munich in the American zone making it attractive for firms from the Soviet zone and the accommodation of refugees from the former east of the German Empire (Götschmann, 2013; Bruder, 2009, 10).

### Reconstruction

After the war a debate took place between proponents of the reconstruction and novelty actors who considered the destruction of the city as a chance to put their ideas into practice. Important is the development of ideas of modern city planning (Albers, 1996; Harlander, 1998; Zhu, 2007). Although in West Germany many radical proposals were made, existing norms, conflicts about the right combination of new and old and the elements of the built environment that had survived the war made it difficult to break with the past (Nederinger, 1984; Albers, 1996; Harlander, 1998). Also of influence was the desire to promote individualisation in contrast to the collectivisation which endured under the National socialists and in the communist east. For example, homeownership was supported in order to weaken support for extreme

movements and strengthen democracy (Bruder, 2009, 11). In terms of cognitive rules the spatial separation of modes of transport, economic growth and owner-occupation were important (Nerdinger, 1984; Zhu, 2007, 44).

Radical proposals were no exception in Munich and Bavaria (moving the city centre, collectivisation of property rights in Bavaria) but also, here actors supportive of the novelty could not secure important positions (see Nerdinger, 1984). The conservatism mentioned above was particularly strong in the regime in Munich: the mayor at the time considered massification and materialism as being connected to the national-socialism (Nerdinger, 1984). In light of this it is not surprising that an attachment to the historic city was instrumental in the decisions around the Meitinger *Wiederaufbauplan* (reconstruction plan) (Meitinger, 1946; EXP3; Hiemen, 1984; Schmucki, 2001). Furthermore, infrastructure had survived the war further thwarting radical proposals (Himen, 1984; EXP3). The plan took account of economic interests and traffic, namely spatial separation of modes of transport and modern centre forming. This relatively conservative plan was ultimately hindered due to issues around property rights which the *Wiederaufbaugesetz* (Reconstruction Act) in Bavaria, that was never adopted, was intended to address (Nerdinger, 1984; EXP3). Subsequently, decisions were largely made on an uncoordinated ad-hoc basis.

### Housing shortage

In Munich in 1959 the housing shortage was measured at 71,100 units (Bruder, 2009, 10, 20). The federal minister of housing expressed his preference for *Trabantenstadt* (satellite city) while Munich government was a proponent of an edge city (Bruder, 2009, 16–18). The choice was ultimately made for the edge developments. In both cases the solutions put forth by policy makers were in keeping with experts. Those involved with the development of the *Stadtentwicklungsplan* (city development plan, STEP) saw the closed blocks of the nineteenth century city as not compatible with modern transport whereas edge estates would alleviate pressure on the city centre (cf. discussion of STEP, 1963 in ‘Rise in car ownership and responses to it’ on the following page; Bruder, 2009, 14, 23).

### Trouble: traffic congestion

In the early 1950s the situation on Munich’s streets was described as traffic chaos. The increasing car use and ownership can be attributed to the rise of the car novelty related to the landscape developments of economic growth, an increasing identification with American values and way of life (Klenke, 1995, 37, 40; Schmucki, 1998) and the changes in land-use that resulted from the way in which troubles that arose due to a lack of space were resolved leading to functional separation. This can be linked to

changing practices of households and firms, namely the concentration of firms in the centre and households at the city edge and in the region, leading to longer commutes (see Table 2).

According to Klenke (1995, 35, 63) cultural changes, namely individualisation, became increasingly visible in federal policy where support for the car was seen to strengthen this and hinder collectivist threats (see also Gall, 2001). Even the public transport lobby was supportive of the car (Schmucki, 2001, 95). An ambiguous attitude towards the USA was however visible in terms of transportation planning. German experts were interested in the transportation planning there early on (e.g. Neumann and Feuchtinger, 1937). After the war this interest increased (e.g. Liebbrand, 1957; Feuchtinger, 1957) but went hand in hand with a critical examination of the developments there (e.g. Feuchtinger, 1948; König, 1948; Ströbl, 1955a), as discussed in the section on the next page.

### Rise in car ownership and responses to it

In the first half of the twentieth century the novelty of the car was well developed (see Schmuck, 1996; Merki, 2002; Hölzinger, 2002). They describe a transition similar to Geels (2005) where the rise of the car was possible due to a combination of diminishing resistance, attempts at popularisation in part through technical innovation and support from higher echelons of society.

In contrast to the resistance to many novel ideas in land-use planning it was generally accepted that the car needed to be accommodated in the city. The major question was how and to what extent. The initial expectation that no urban motorways would be needed in Munich (Feuchtinger et al., 1956) gave way under pressure from city councillors in the newspapers (Ströbl, 1951; 1953; 1955; SZ, 1953; Hahn and Althen, 1954) including *Süddeutsche Zeitung* and its *Verkehrsparlament* (Zimniok, 1964, 31), in which domestic and international policy makers, interest groups (ADAC) and traffic engineers were represented (SZ, 1949; Ströbl, 1951). In the course of the 1950s planned interventions became increasingly concrete and radical (extensive networks of radial and ring roads) (Münchner Stadtrat, 1954; Fischer, 1955; Högg, 1958). Concurrently experts attained an increasingly prominent position. This was possible due to the uncertainty of policy makers under pressure to act and the expectation (and sometimes blind confidence) that solutions based on scientific insights could permanently resolve the troubles (see Verkehrsplanungs- und Werkausschuss, 1955, 61; Münchner Stadtrat, 1954; 1959; 1961; Arbeitsgemeinschaft für die Verkehrsplanung München 1956:30; Planungs- und Koordinierungskommission, 1960; Feuchtinger et al., 1956). The result was the STEP of 1963 in which the change in solutions is visible (LH München, 1963, cf. discussion in 'Reconstruction' on page 705).

## Public transport development

The discussion regarding the car in transport planning was not free of criticism. Early on it was realised that an American level of motorisation would be problematic given the historically developed artefacts. In Munich, public transport and the car were seen as complementary and necessary to guarantee the accessibility of the centre without destroying it. Mayor Vogel (SPD) was elected in 1960 partially due to his promise to solve the traffic problems with a focus on public transport as part of the solution for traffic congestion (Grauhan and Linder, 1974, 90).

At the end of the 1950s plans for underground public transport became more concrete. Both the Deutsche Bundesbahn (DB) and the municipality took interest in an east-west line under the central city (Linder, 1973, 40). The municipality wanted an underground tram (*Unterflasterstraßenbahn*) and the DB a regional train (*S-Bahn*). Proponents of the S-Bahn argued that this would be the best solution for the housing shortage (Linder, 1973, 102; 103; DB, 1960). The West German institutional arrangements meant that Munich was dependent on higher governments to finance public transport (Grauhan and Linder, 1974, 91). In this period Bavaria invested in public transport, but because of the rural nature of the land, regional development and decentralisation were larger priorities than the development of Munich (see Gall, 2001). The municipality itself began increasingly to see that a radial metro (*U-Bahn*) was the better choice (Schmucki, 2001; Linder, 1973, 106, 107). The pressure on politicians to take action should not be underestimated. Grauhan and Linder (1974, 91–92) conclude that for local policy makers every solution for the transport crisis was seen as better than nothing.

In contrast to the stable financing mechanisms for road construction there was no stable framework for financing public transport in West Germany (Hielscher, 1961; BMW and LH München, 1961). In the case of Munich, coalitions and activism played a determining role in the outcomes achieved. The pressure exerted through the initiative of Mayor Vogel on the federal cabinet by members of the CSU, governing party in the Bundestag and the Chamber of Industry and Commerce, resulted in the decision from the federal government to cover 2/3 of the costs of the S-Bahn. The financing of the U-Bahn was guaranteed in a similar fashion. The *Städtelobby* (City lobby) created upon the initiative of Mayor Vogel organised events such as a *Fliegende Pressekonferenz* (flying press conference) to attract attention to the traffic situation in West German cities (Stadt Bremen et al., 1961; Vogel, 1960; 1961, Deutscher Städtetag, 1962). The result of this process was commitment to underground public transport from 1966 onwards as part of a broader change in cognitive and regulative rules at the federal level whereby the focus of transport policy goals broadened to include the health of the city (Bundesminister für Verkehr, 1964; GVFG, 1971). The arrival of a SPD minister of transport was both a symbol of the change and support of it. At the same time the *U-Bahn-Amt* (Department) was established with one goal: the construction of the U-Bahn.

## Transition 2

From the early 1970s onwards the changes in the transport and land-use system (see column 3, Table 2) are increasingly related to the trouble of the changing character of the city as a result of the interventions from the previous transition. The debate focused on the objectives of planning and the necessity of the interventions.

The changes in transportation networks and land-use in the first transition period clearly affected locational choices and travel behaviour in the second transition. The improved accessibility of the central city as well as the emphasis on the scaling up of the centre, combined with the improved accessibility of the region with the arrival of the S-Bahn and through-road construction, made it possible to concentrate development in the centre and develop housing in the edge areas and in the region, as was already the case in the first period. Furthermore, the increasing growth of the service sector exacerbated this (Kohlmaier, 2007). For families, housing in the central city was expensive and many neighbourhoods were dilapidated (Linder, 1973, 185, 188). Changing practices and road construction were framed as evidence of and leading to a loss of character of the city, the trouble observed in this period.

### Trouble: loss of character of the city

From the late 1960s a supposed loss of character in Munich was criticised by interest groups which needs to be seen in the light of increasing national and international uncertainty regarding the impacts of modernisation on the environment (Club of Rome, UN Conference on the Environment of 1972; Klenke, 1995, 84–85), democratisation as a result of economic development, a shift in priorities from reconstruction to participation in public life, environmental protection and equality of the sexes (Zhu, 2007, 47) and economic stagnation after the oil crisis of 1973. The first conflict surrounds the demolition of historic buildings and housing in the central city to create space for offices and roads and the second, the abolition of the tram.

Towards the end of the 1960s the changes in the urban fabric became an issue of discussion for students, architects and citizens united in fora such as the Münchner Bauforum. They expressed criticism about the radical change in the urban fabric (sometimes described as *Zerstörung*; destruction) and the loss of character and originality of the city and nature areas (Spiegel, 1968; Grauhan and Linder, 1974, 103). According to these actors, alternatives to these interventions should have been considered (see Schmucki, 2001, 343; LUP1; INT1). In addition, the reliability of demographic and traffic forecasts was disputed. Critics saw these as methods in exploring possible scenarios rather than certain predictions of the future (Wallenborn, 1967a).

Initially, regime actors were shocked and reacted defensively to the opposition (see Klühspies, 2009), but quite quickly they were prepared to commit to making planning

more open and to integrate the Bauforum in the planning process (Wallenborn, 1967b; Luther, 1968, LUP1). In this period problem definitions and heuristics changed rapidly as evidenced in the STEP of 1974/75 (see LH München, 1975) as well as the statement of the successor of Mayor Vogel that Munich should become *kein Manhattan aber auch kein Museum* (not Manhattan but also not a museum) (Fischer, 1975). Grauhan and Linder (1974, 104, 129) suggest that this rapid change in the regime was intended to depoliticise planning issues. In appraising these changes one should also take account of the pressure on Vogel within his own party, the SPD, due to a supposed loss of character of the city (Schmucki, 2001, 345) and the extent of criticism both in relation to various issues (see Gerstenberg, 2014) and at the international level (see, for example Jacobs, 1961). In West Germany it became rapidly evident that Stadtentwicklungsplanung could not fulfil the expectations placed on it in light of demographic, cultural and economic change (Albers, 1996; Gnest, 2008; Mitscherlich, 2008; 1965). A shift towards participation in planning is visible in legislation (see, for example BBauG, 1976) and in practice planning became more incremental and fragmented (see Albers, 1996; Gnest, 2008).

In both Munich and nationally the process of change lasted until the early 1990s. Nationally, only limited reductions in financing for road construction can be observed, as can the double focus: technical solutions such as new fuels, catalytic converters and combinations of personal and public transport in addition to changes in travel behaviour (see, for example Klenke, 1995, 104–5; Bratzel, 1999, 207; Schmucki, 2001, 164, for a more extensive discussion). Three conflicts can be distinguished in Munich:

- 1) Conflicts around the vision for the city – Schmucki (2001, 345) writes that at the Stadtentwicklungsreferat (city development department), where the influx of new employees compared with other departments responsible for the U-Bahn, building construction and finance (U-Bahnreferat, Stadtbaureferat and Stadtkämmerei) was larger, practices changed more rapidly. Some projects (Isarparallele, Virualienmarkt) were stopped, but other projects (European Patent Department, Prinz-Carl-Palais tunnel) were carried out (INT1). Resistance among residents of various neighbourhoods (e.g. Aktion Maxvorstadt, exhibition Erholungsraum Stadt- Leben mit der Straße) and architects (e.g. Schleich, 1978) continued. Gradually the awareness of problems in the city grew, visible in the number of protests regarding planning issues (see Gerstenberg, 2014). According to Schmucki (2001, 367; 371) it was only in the early 1980s that further change was visible (support from the CSU, downscaling of crossings, 30 km/h zones and traffic calming) (see, for example Ströbl, 1979; Roll, 1982) and the focus shifted towards stability (see LH München, 1983).
- 2) Conflicts around different public transport options – The U-Bahnreferat was able to secure a central position in the planning process in this time of financial austerity as the availability of funds came to determine which projects

went ahead in the strategic plans of the Stadtplanungreferat (Grauhan and Linder, 1974, 108). Also of importance was the continuity of financing by the federal government (80 per cent) (Hass-Klau, 1984; Zimniok, 1981, 159; EXP 1&2; INT1). Criticism was expressed with regard to the coordination of these investments with land-use and other modes of public transport (INT1&2). From the start of the U-Bahn construction the tram was neglected but only at the moment that a plan was presented to fully abolish the tram (öV-Konzept 2000, 1982, 27) did resistance arise (within the Münchner Forum, Aktion Attraktiver Nahverkehr, SPD and FDP and from councillors and residents along tram lines) (Fischer, 1982; Graupner, 1982; INT2). For the transport company, abolishing the tram was an issue of progress while for opponents the tram was a part of a liveable city. The postponement of the plans (Müller, 1984) was followed by the electoral success of Georg Kronawitter (SPD) in 1984 with the slogan *so viel Trambahn wie möglich* (as much tram as possible) (Schmucki, 2001, 382). Where only a few years earlier research showed that only the U-Bahn would result in increases in ridership, studies now showed that an expansion of the tram was the better option (Müller, 1984). Following this in 1988 the purchase of new rolling stock was approved followed by a plan that considered different modes of public transport integrally in 1990 (Müller-Jentsch, 1988; 1990; INT1&2).

- 3) Conflicts around transport policy – In the late 1980s it was reported that a stalemate existed in transportation planning in Munich (Büsehmann, 1989). Examples of this are the rejection of a proposal of BMW for a *blaue Zone* with limitations for car use and the conflict regarding a tunnel in the Mittler Ring that exposed the division between the Green Party and the SPD who focused on liveability and the CSU, ADAC and chamber of industry and commerce who considered car accessibility as essential (Kesselring, 2001, 113–16). According to Kesselring (2001, 85, 117, 145) change occurred in this situation when the Green Party realised that cooperation with an organisation that was not focused on ecology (BMW) could be advantageous and the departing CEO of BMW invited politicians and interest groups to discuss transportation issues together. The result was the agreement to make progress on issues where there was no principal disagreement (see BMW and LH München 1998, 6). Issues of intensification of development around public transport and in central areas as well as parking policy received attention (see LH München, 2005). This resulted in the depoliticisation of mobility policy. Conversely, with regard to issues where agreement was absent policy was not formulated or objectives remained unclear. Since 1995 and up to this day these actors have regular dialogue (Inzell-Initiative).

### Transition 3

From the late 1990s onwards we observe two new troubles driving change in the transport and land-use system (see Table 2, column 4): those related to the regionalisation and the allocation of road space, specifically in relation to the bicycle. As this transition is still ongoing we are cautious in drawing conclusions, therefore this discussion is more descriptive in nature than the previous two.

#### Trouble: regionalisation

Due to the strong economic performance of the region of Munich, the region and the edge of the city have been experiencing considerable growth in terms of both population and employment (see Figure 2 and Table 2). Conflicting views on and responses to regionalisation are epitomised by the debate around a second S-Bahn tunnel under the central city (Brauer, 2009). The decision resulted in criticism from interest groups (Münchner Forum among others) who pointed out that these investments were contradictory to the idea of polycentricity and that it would have been better to invest these resources elsewhere in the city or in the region (Hutter, 2006; Bock, 2010; LUP1 and INT1). Despite the continued criticism the tunnel was finally approved by the municipality and Bavaria (Bock, 2010; DB and BSMWIVT, 2012).

The awareness of the troubles arising from population growth and changing traffic flows is growing as Pütz (2006), Priebis (2006) and Habaoui-Engelhard (2008) show, but regulative rules (autonomy of municipalities and planning competencies) as well as the electoral system that emphasises individuals instead of parties, hinder change (Reiß-Schmidt, 2003; Haberer and Mailer, 2005; EXP1&2; TRP1; INT1&2; LUP1). The signals at higher levels are also contradictory. Nationally, the necessity of a regional approach is recognised (BMWBS and BBSR, 2009) as well instruments that support this but in Bavaria planning is seen as a hindrance and the policy attention has decreased (Gnest, 2008).

#### Trouble: allocation of road space

In the framing of this trouble one of the main arguments is the growth of cycling. This in turn is related to both the growth of young (25–29 years of age) residents in Munich in the areas surrounding the central districts (see Table 1), a group which is more likely to bike (SINUS-Institut, 2011), and the rising status of this mode of transport (BMVBS, 2012, 10; SZ, 2012; Tibudd, 2012; Infas and DLR, 2010). In the case of the issue of road space conflicts have recently arisen between political parties (SPD and Grünen) who see cycling and more space for cycling infrastructure as positive, and the CSU and FDP who emphasise the importance of car accessibility (Völklein

and Anlauf, 2011; Dachale, 2011). In addition there are interest groups involved who have carried out actions to demand more space for cycling (see Tibudd, 2012). Part of the explanation lies in the exceptionally rapid population growth in Munich (Kübis, 2012, LH München, 2011a) and unless successful efforts to support cycling are made (Lanzendorf and Busch-Geertsema, 2014) it is expected that congestion on roadways will grow and this conflict will remain.

## Discussion and conclusions

The central question in this exploratory paper is that of why and how transitions in the regional transport and land-use system occur. In Munich, in the first period of transition we see a situation where the novelties of modern city planning and the car were well developed at the moment that ‘avalanche’ landscape change (Geels and Schot, 2007) took place (Second World War, division of Germany, orientation towards USA, *Wirtschaftswunder*). Troubles arose as a result of the related change in practices of households and firms in interaction with artefacts (housing and office stock, land-use and transport infrastructure). The lack of resistance towards the car and limited resistance towards modern city planning suggests that these novelties that were developed in the first half of the twentieth century, were becoming dominant in the regional transport and land-use system. Cognitive rules were largely shared among actors. Pressure from interest groups (newspapers, citizens, scientists and progressive city council members) was focused on the further development and implementation of solutions. In terms of land-use planning more radical cognitive rules were present (relocation of the city centre, modern city form in the centre, collective property rights). These were, however, contradictory to the normative attachment to the historic city and/or to the dominant liberalism. In Munich, but also in other West German cities proponents of related interventions did not secure central positions. More consensus existed with respect to what to do in the areas outside of the old centre and the importance of serving economic interests (space for the car and modern urban form). The discourse of a malleable society legitimated certain choices (role of engineers, integral Stadtentwicklungsplanung) and is evidenced in the names of policy documents (‘Ein Land plant seine Zukunft’ – a Land (state) plans its future). Especially in this first period of transition the importance of the federal level is evident (e.g. its key role in financing transport infrastructure). Regulative and normative rules embodied in the actions of actors at the national and local level expedited the development of shared cognitive rules. The importance of interest groups is evidenced by the situation around underground public transport. In various constellations policy makers in Munich were able to act as interest groups at the national level to achieve change in cognitive and regulative rules there.

The start of the second transition resembles a specific ‘landscape shock’ (Geels

and Schot, 2007). Novelty actors critical of anomalies in the discourse of the first period of transition took action in light of landscape changes, but also the interventions aimed at changing artefacts to conform to dominant cognitive rules. They defined these interventions as the second destruction of Munich. Just as the regime actors in the first period of transition emphasised the importance of the retention of the historic city and the economic vitality of it these actors referred to the loss of identity of the city. They argued that the planned interventions and those that were already carried out would achieve the opposite of what regime actors initially intended, and destroy rather than reinforce the identity of the city. The fact that this protest occurred in other West German cities and abroad strengthened the novelty and resulted in similar discussions at the national level. In this initial period resistance from regime actors was clearly visible. Shortly after this we observe changes in discourses (liveability and democracy instead of progress and technocracy), but contradictions between the text of policy documents and practices suggests differences in cognitive rules between actors and departments in the city government. Actors who were placed under pressure (Mayor Vogel) or new actors (Stadtplanungsamt) approached the situation much more differently than those who were well-established. The course of the second period of transition is characterised by stalemate and conflict regarding cognitive rules (problems and solutions). The old regime became weaker (e.g. public transport planning, meetings organised by BMW), but after the landscape shocks at the beginning of the period the rest of the period was relatively stable. Much of what was achieved resulted from conservative actions (impeding rather than realising developments).

The third period of transition is clearly different than the earlier periods as the object of study is a transition that is still unfolding. Economic, cultural, demographic and technological changes have influenced the practices of households and firms. Novelties that met with resistance (biking, limiting car use) or that were ambiguous (urban living, regional cooperation) in the second transition are increasingly being embraced by regime actors, even those for whom this would have been unthinkable in the second transition period (such as BMW, established parties and regional municipalities). With supportive changes in practices the novelties could be further strengthened resulting in shared cognitive rules leading to positive change instead of the prevention of undesirable developments.

Based on the description of how these transitions have taken place we propose for future elaboration and testing the following hypotheses on why and how transitions in regional transport and land-use systems take place:

- 1) Changes in the practices of households and firms create the pressure needed to realise transition (as captured by the emergence of foci of debate and conflict or 'troubles')
- 2) Interest groups interpret landscape changes and changes in practices to legitimise

- new structures and create pressure on the regime necessary for transition
- 3) The identity of the city is a powerful discursive element that can be used to delegitimise or legitimise structures and practices
  - 4) Reaching shared cognitive rules enables change in the types of interventions in artefacts at the system level. Related to this hypothesis, two hypotheses with regard to how these shared rules can be reached:
    - a. Regulative and normative rules that are both open to conflict and effective in resolving it accelerate the reaching of shared cognitive rules.
    - b. Interest coalitions are a way to exert pressure to achieve change in cognitive rules at other scalar levels.

The contribution of this research to transition studies is that it shows that a transition in the built environment differs in a number of ways from transitions that have been previously researched. Firstly, the inertia of the built environment (transport and land-use) and the costs and timespans involved with changing it suggest that the transition pathway will rarely resemble radical pathways like technological substitution or de-alignment and realignment (see Geels and Schot, 2007). In contrast to other types of artefacts the normative attachment to the built environment seems a determining factor, not just its physical obduracy. This also results in the long-term nature of changes. Furthermore, the conceptualisation of spatial scale levels enables more attention to the interaction between different systems (e.g. regional and national).

The relevance of this research for planning lies in three aspects. Firstly, it shows that transition in the urban region is the result of dynamics in land-use planning as well as transportation planning. Secondly, the consideration of interaction between the two is necessary to understand change. Finally, and perhaps most importantly, attention to the demand side (practices of households and firms) as a key trigger for systemic change, the interplay between conflict and consensus and the role of interest groups to deliver radical change are relevant for planning which aims for transformative change. Practices of household and firms create the urgency for change. Interest groups play an important role as they can politicise and draw attention to troubles, and exert pressure to address them. Conflict is unavoidable in transition and should not be seen as negative. At the same time consensus between different interest groups needs to be reached and stability achieved to bring about change in the built environment and infrastructure. Policy makers remain important, but are only able to adjust the course of events.

In this embedded case study of Munich we have shown how the multidisciplinary conceptual framework of Switzer et al. (2013) can be used to structure research on historical transitions in the regional transport and land-use system. In this application of the framework the importance of interaction between various scalar levels has become clear – especially between the national and the local, but also between the international level and the *Länder*-level in Germany. Raven et al. (2012) emphasised the

necessity of attention for scalar levels in addition to the levels of structuration in the MLP. In addition Whitmarsch (2012) has been critical of the inclination to consider everything which does not fit into the definition of the system as being landscape. This remains to be fully explored, but there are indications that discourses, a major explaining factor of transition dynamics, change as a result of developments in various systems (e.g. democratisation as a result of criticism of top-down city planning in addition to conflicts in other areas). Follow-up research should devote more attention to the conceptualisation and operationalisation of scale as well as the interaction between various systems. In addition the robustness of the hypotheses posed needs to be examined by testing them in other cases of literal replication (see, for example Yin, 2009, 54) considering their transferability or external validity (Bryman, 2008, 377). This also addresses the concern raised by Dewald and Truffer (2012), as well as Lawhon and Murphy (2012), that transitions research should devote more attention to the importance of place-specific characteristics in transition.

## Appendix A: Interview respondents

<i>Code</i>	<i>Description</i>
EXP1	Researcher transport and land-use
EXP2	Researcher transport and land-use
TRP1	Policy maker transport
EXP3	Researcher planning history
INT1	Interest group transport
INT2	Interest group transport
LUP1	Policy maker land-use

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