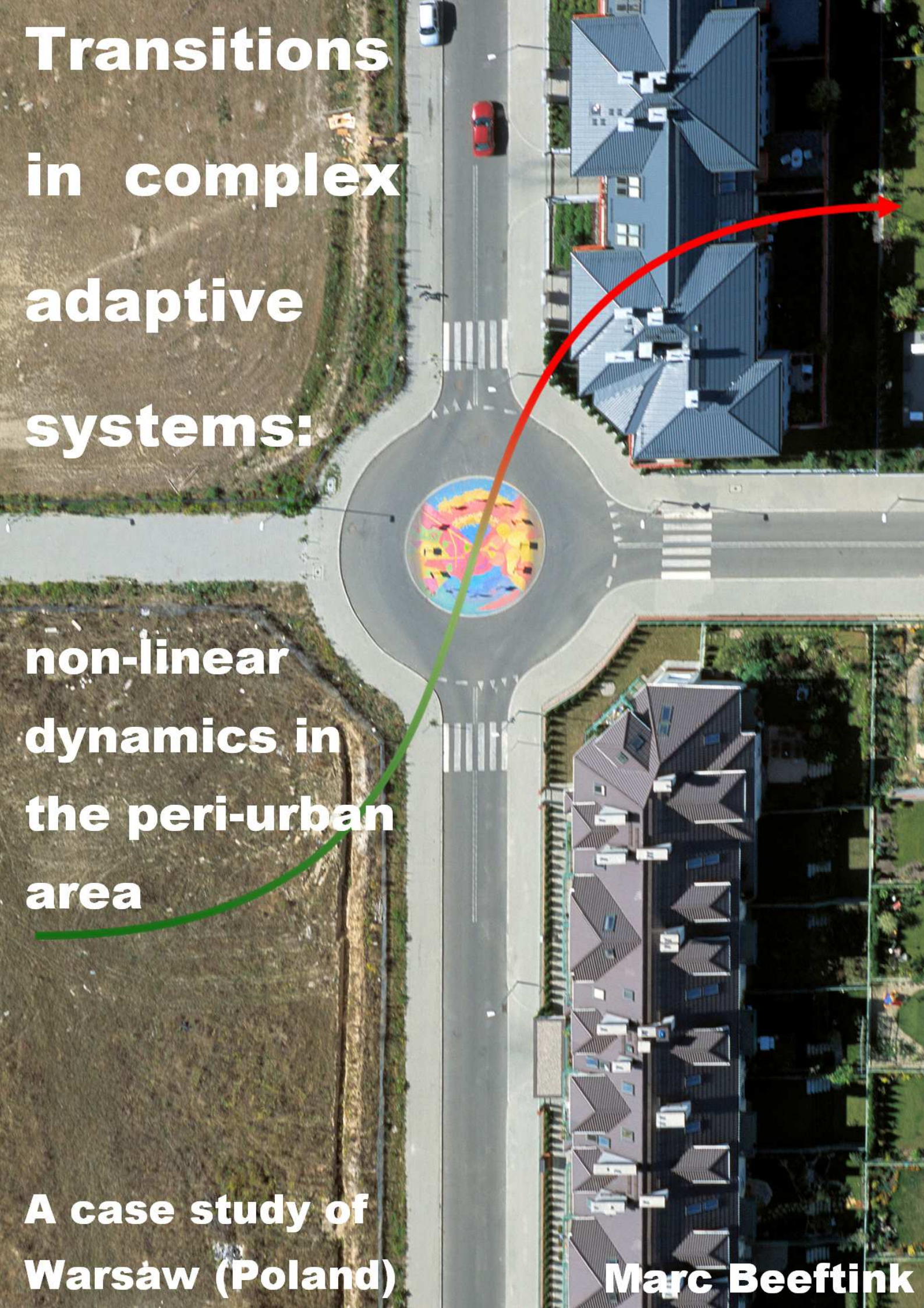
Transitions in complex adaptive systems:

non-linear dynamics in the peri-urban area



A case study of Warsaw (Poland)

Marc Beeftink

Peri-urban Land Use Relationships (PLUREL)

Transitions in complex adaptive systems:

non-linear dynamics in the peri-urban area

A case study of Warsaw (Poland)

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Master thesis
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Summary

The traditional spatial organisation of the peri-urban area, with a clear distinction of urban and rural functions, is changing towards an integrated urban-rural area with its own non-linear dynamics, which could be regarded as a complex adaptive system. Increasing complexity of urban-rural relationships in the peri-urban area often result in policymakers not to be well equipped to deal with dynamics in such areas. In order to improve the ability of planners to deal with non-linear spatial processes, this study suggests to consider fundamental changes in peri-urban areas as transitions. Transitions are a vital understanding in complexity theory, necessary for the adaptive capacity of complex adaptive systems. The objectives of this study are to examine whether fundamental changes in the peri-urban area could be better explained by the concept of transition and to contribute to a new perspective that could result in planning strategies that are able to deal with non-linear processes.

A transition is defined here as a gradual, continuous process of fundamental change within a society or culture. It can develop and vary in speed, length and scope. Transitions are multidimensional, multilevel, qualitative and irreversible processes. The following phases can be distinguished: predevelopment; take-off; tipping point; acceleration; and stabilisation. Within these phases a dynamic equilibrium of stable and dynamic elements shifts and either innovation or decline will occur.

The case study analysis of Warsaw's peri-urban area (1945 to present) provides a better understanding of the multilayered and multidimensional aspects of non-linear spatial processes. Macro developments (the context), such as political events and economic trends, have strongly influenced regional dynamics in the case of Warsaw. During the communist era (1945-1989), global economic trends were increasingly disregarded and national (and Soviet) policy largely determined developments in Warsaw's peri-urban area. Especially the replacement of the market economy by a centrally planned economy left its mark: spatial-economic developments, driven by market forces of demand and supply, were replaced by ideology driven, supply oriented developments. This resulted in a regional mono-economy of heavy industries and the construction of monotonous residential areas, existing of identical prefab residential estates. During the 1970s and 1980s, the effects of global economic trends, such as the rise of the service economy, increasingly trickled through the Iron Curtain, with a decline of the mono-economy in the Warsaw region as a result. This is, *inter alia*, seen as a predevelopment of the transition of the peri-urban area. Autonomous push processes, such as spontaneous deindustrialisation, privatisation, and development of single family houses, heralded a new role for the peri-urban area. These developments are considered as the take-off in the transition. With the political revolution of 1989, including a new regime, governmental decentralisation and the breakdown of the centrally planned economy, Warsaw's peri-urban area came under market influences again. This is seen as the tipping point in the transition. The 45 years absence of market economy had resulted in a spatial-economic vacuum: e.g. the rural parts of the peri-urban area, even areas adjacent to the city, was characterised by extensive agriculture. Moreover, an immense surplus demand had come into existence, as a result of which nearly every kind of development was welcomed with open arms. Consequently, in the peri-urban area hypermarkets, small business enterprises and residential areas were developed. This is seen as the acceleration phase in the transition. Although the individual quality of these developments was indisputably higher than that of developments during communism, the cohesion of the peri-

urban developments could use some improvement. A rather limited governmental influence on spatial development and competition between municipalities seem to be the main causes. Coherence might improve with the institutionalisation of a regional public organisation, to obtain robust and sustainable development of Warsaw's peri-urban area. This would be considered to be the stabilisation phase of the transition.

The transition of Warsaw's peri-urban area, adapting to the demands of the global service economy under different circumstances, provides the spatial planner with useful insights how to deal with such complex adaptive systems. A starting point for the actions of the planner could be that rural-urban regions in principle have adaptive capacities. Hence the planner's challenge is to increase the adaptive capacity and resilience of such regions. A point of special attention during relatively stable phases could be avoiding overspecialisation, which might lead to a *lock-in*. In the case study, it appeared that the protection of existing structures and economies eventually led to a decline of the region. In order to avoid this from happening, important aspects are maintaining flexibility through diversity: encourage competition and strive for complementarity. Furthermore, in order to prepare a region for a transition, scouting for (autonomous) macro trends, trying to reason out the implications of the observed trends for the region, and stimulating micro innovation (heralding adaptation of the system), are seen as essential. The peri-urban area seems pre-eminently the proper location for such micro innovation. During relatively dynamic periods, securing the system's robustness, without blocking the ongoing dynamics, is seen as vital. Stimulating the regional cohesion of developments and the compatibility of functions on a local level are means to achieve this. In order to manage this, steering from a system (in this case regional) level is essential. Furthermore, since a transition includes multi-dimensional change, the integration of multiple sectors of regional management is of fundamental importance. Especially economic developments were found to be crucial for spatial changes.

Key words: *Peri-urban area, transition, non-linearity, complexity, spatial planning, Warsaw*

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Preface

Here it is: my master's thesis. Swiftly put: although writing seems easy, it is not. Writing what you want to write, involves asking exactly that question: 'What do I want to write?' Or: 'What do I want the reader to read?' Furthermore, in my case, asking yourself another question seems equally important: 'What don't I want the reader to read?' Currently, as I am writing this foreword, I know the importance of these questions. It is one of the many things I have learned writing this thesis. Although seeing the other 220 European Credits of the study as stepping stones towards writing my Master's thesis does not do justice to the knowledge and experience I have gathered during those courses, I must admit that writing this thesis was the hardest part of the entire study by far. It turned out that nearly every writing process involves getting stuck at a certain moment. Therefore, I was supported by the stories of nearly everyone I talked to: they had been there as well. And as the saying goes: *company in distress makes sorrow less*.

Therefore, the happy memories prevail. The research involved the opportunity to literally be *working at the frontiers of knowledge*, the University of Groningen its motto. Not only does complexity theory offer valuable insights, it seems to be a relatively unexplored scientific discipline. While exploring numerous possibilities and implications of this theory, I caught myself several times considering myself a pioneer. Also the object of this study, the peri-urban area, could be seen as a frontier. At first sight it is a frontier of urban growth. When looking closer, the peri-urban area also seems a frontier of spatial development, of innovation. And finally, the entire process was especially working at my own frontiers: exploring physical and mental places I had not been before.

Since writing this thesis took a while, I could elaborate a bit more about the things I have seen, learned, and experienced. However, another thing that I have learned about writing is that you have to be a modernist to be a good writer. *Less is more*, as it was put by Ludwig Mies van der Rohe, seems to well catch the essence of writing. Since a modernist perspective does not seem to grasp the entire complexity of this research topic and perspective, this could be the essence of my difficulties with writing brief and to the point. But I am learning...

Finally, I will finish this foreword by saying thanks to a few people. First I would like to express my gratitude to Gert, my supervisor. I know Gert quite a while now, and I must admit that he sparked a fire of curiosity in me, which is still burning. Moreover, while being stuck a few times writing this thesis, I could endlessly enjoy his confidence. Therefore I am glad that we will continue working together. Next, I would like to thank Ward. Without Ward, this research would not have been close to what it is now, not just because we wrote the first chapters together. Both professionally and personally, I think we complement each other really well. Therefore I am glad to continue working together too. Furthermore, I would like to thank the entire Groningen PLUREL research group for your support, our discussions and your company. Terry, Stefan, Richt, Corien, Koen and of course Delik, many thanks! Finally I would like to thank my friends and family, my parents in particular, and Woldi, for supporting me no matter what.

Groningen, August 2009
Marc Beeftink

Chapter 1: Introduction

Marc Beeftink & Ward Rauws[1]

1.1. Background

The peri-urban area plays an important role in sustainable development (Bertrand & Kreibich, 2006), because of its high potential for change. Traditionally, rural functions near urban areas are transformed into urban functions, as a result of concentric urban growth. The relation between urban and rural areas is currently changing into 'new patterns of built/ non-built and multi-functional land use [creating] new functional systems and land use types, covering larger areas at regional and inter-regional scale' (Hudalah, 2007, p.1). The clear typology, in which the city is the 'marketplace', and in which the surrounding rural areas are the agricultural 'production grounds', does not fit to the complex and interdependent relationship between urban and rural areas, for a considerable amount of time. Yet, in people's minds, the clear dichotomy of rural and urban still exists. This obsolete conception of reality, also present in planning systems and policy frameworks, often causes policymakers not to be well equipped to deal with increasingly complex peri-urban dynamics (Hudalah, 2007; De Roo, 2003). Because of these 'dynamics', coordination and integration are often missing in peri-urban areas, while both are two key elements of spatial planning (Bertrand & Kreibich, 2006; Hidding, 2006; Van Engelsdorp Gastelaars, 2000; Van Zoest, 2008). In order to improve the ability of policymakers to deal with spatial changes, Hudalah & De Roo (2007) suggest considering fundamental change in rural-urban relationship as transitions. Transitions are an important understanding in complexity theory. This study aims to examine opportunities in order to improve our understanding of the peri-urban area, by regarding it as a complex phenomenon and simultaneously to contribute to a new perspective that could result in possible recommendations for planning strategies.

1.2. Aims and objective

Fundamental change in the peri-urban area could be explained by the concept of transition. According to McGranahan *et al*. (2001), urban-rural interactions exist at several levels, dealing with different subjects and various scopes. Rotmans *et al*. (2001) define this as a multilayered perspective in which micro, meso and macro levels can be distinguished. Hudalah & De Roo (2007) identify three interrelated types of change; functional, organisational, and institutional. This study aims to identify transitions in the multilayered processes of rural-urban relationships in recent history of a case study, the region of Warsaw. This multilayered and multidimensional division will be elaborated on in the next section.

The objective of this study is *to examine whether fundamental changes in peri-urban areas could be explained by the concept of transition and to contribute to a new perspective that could result in planning strategies that are able to deal with non-linear processes.* This objective results in the research question and several sub questions:

How to use the concept of transition to understand fundamental change in the peri-urban area and what could be possible consequences for spatial planning?

[1] Ward Rauws is a master student at the faculty of Spatial Sciences of the University of Groningen. Chapters one and two, and Appendices A, B, C and D are the result of a co-production with Ward Rauws.

1) What is the linkage between the concept of transition and rural-urban relationship changes?
   - What have been potentially important transitions in the case study region in recent history?
2) What has been the interconnection between the identified transitions and spatial planning?
   - Can spatial strategies be of substantial importance to rural-urban relationship transitions?

1.3. Theoretical context

After having determined the research objective and research questions, this section introduces the theoretical context in which this research is embedded. This starts with the assumption that urban and rural areas once were rather divided, i.e. from a single functional relationship of rural food production for the consuming city, to a multi-dimensional and complex interplay of rural and urban functions.

Sharply divided urban and rural areas hardly exist anymore and rural areas in urban regions have transformed into 'land in de stad' (Hidding, 2006), 'Zwischenstadt' (Sieverts, 2003) or 'space between cities'. A third type of landscape has developed, as a result of intensifying rural urban relationships. For instance, in the Netherlands the peri-urban area emerged from the 1950s onwards (Van Engelsdorp Gastelaars, 2000), although the first increasing rural-urban relationships could be traced back to the construction of the first country houses and the outplacement of nuisance causing industries such as tanneries. Nowadays, besides urban and rural areas, peri-urban areas can be distinguished. On the one hand, those areas are too 'green' and the building density is too low to indisputable be acknowledged as urban areas. On the other hand, it is too crowded with urban functions to undeniably be seen as rural areas (Van Engelsdorp Gastelaars, 2000), hence expressions such as rurban area and urban field. Peri-urban areas have become multifunctional interrelated zones. Flows of people, goods and communication in those regions are increasingly bypassing the core city (LeGates & Stout 2003, Tacoli, 1998). In polycentric regions such as 'De Randstad'[2], information flows between the core cities are not dominant anymore to the peri-urban flows (Hall, 2008). Hence, the economic role of the peri-urban area has become rather extensive, which indicates the relevance to better understand the complex interplay between processes of change in the peri-urban area.

In contrast to its (economic) viability for urban regions, the understanding of the peri-urban area, in all its complexity, seems to be decreasing. The planner increasingly loses grip on partly autonomous and interconnected processes of change occurring in the peri-urban area, which consequently seems to have a will of its own. Moreover, planning instruments and institutions appear not to have adapted to this changed reality, as a result of which planning measures can have unexpected or unwanted effects (Hudalah, 2007; De Roo, 2003; Van Engelsdorp Gastelaars, 2000). It stresses the necessity of a new framework to understand processes of change in the peri-urban area and to deal with them.

This framework is sought in the complex systems theory, which is shortly introduced here and elaborated on in section 2.3. In this study, the peri-urban area is regarded as a complex adaptive system. By doing so, the occurrence of autonomous processes, involved with the continuous adaptation processes to an ever-changing

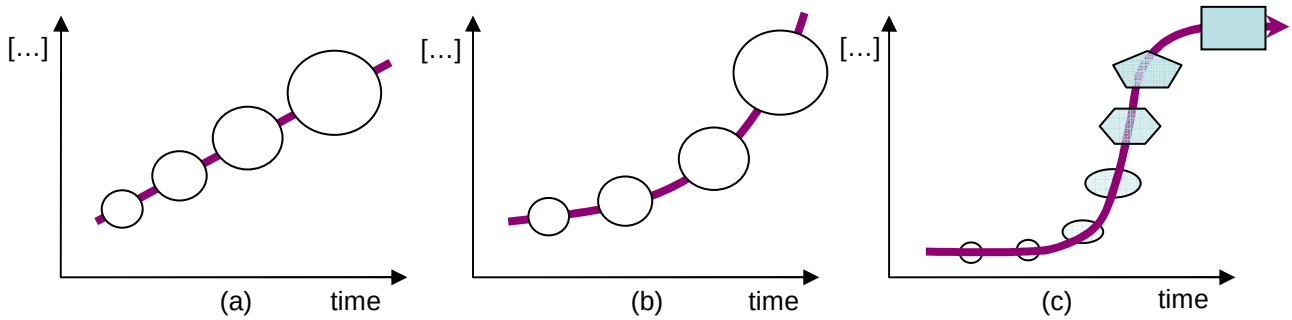
[2] 'De Randstad' is a notion for the west wing of the Netherlands including the four largest cities of the country; Amsterdam, Rotterdam, The Hague and Utrecht.

context, is explicitly acknowledged. Furthermore, the system is expected to change its characteristics in time, as it is continuously evolving. Consequently, relative static and dynamic periods interchange, during which the context and causality are assumed to be variable. As a result time becomes an important factor in planning, which can hardly rely on a single approach. Peri-urban areas are acknowledged to be survivable because of the ability to adapt and renew to a changing context, without losing its own identity. This feature is understood as transition.

Rotmans *et al*. (2001) define a transition as a 'gradual, continuous process of structural change within a society or culture' (p.1). A transition is a change of the 'core' of the system. When a transition takes place, the direction of development is highly uncertain, as the system is fundamentally changing. A transition can develop and vary in speed, length and scope (Rotmans *et al*., 2001). Lundberg (1984 in Levy, 1986) mentions a number of characteristics of this "second order change": it is a multidimensional, multilevel, qualitative and irreversible process. According to Breman & Mundle (1991), transition could be triggered by a changing role of the state or the dominant ideology which guides state action, the economic importance of natural recourses or availability of new technology and a shift in the balance of society classes. Hence, for the understanding of change of the peri-urban area it is vital to distinguish multiple dimensions and levels in drivers of change. This is elaborated on in the next chapter.

A system in transition, such as a transition represented in Figure 1.1 (c), fundamentally changes characteristics between two stages of dynamic equilibrium. Contrary to linear and exponential developments which are characterised by quantitative change, visualised in Figure 1.1 (a) and (b), both structure and function can change during a transition, related to an altering context and forms of causality. By using the understanding of transitions in peri-urban systems, we might be able to improve our understanding of non-linear spatial developments. If the concept of transition provides a frame breaking view on processes of change, this could result in new insight in the conditions for spatial development and consequently, recommendations for planning strategies could be made.

Figure 1.1: Representations of (a) linear development; (b) exponential development, both involving quantitative change; and (c) a transition, change of structure and content, quantitative and qualitative change



Adapted from De Roo, 2008b

Hence, the obsolete image of the urban fringe in planning systems and policy frameworks causes planners not to be well equipped to deal with (non-linear) change in the complex peri-urban area. Furthermore, the occurrence of autonomous processes can lead to different results of spatial interventions than foreseen and intended. The

ever-changing reality, the object of planning, causes the planner to respond to change, rather than leading it. This acknowledgement has resulted in a shift in planning thought: from the objective expert in the 1960s, currently the planner is regarded to be an advisor as well as an actor in the planning arena (see Kaiser, Godschalk & Chapin, 1995; Allmendinger, 2002; De Roo & Voogd, 2004).

According to Kaiser, Godschalk & Chapin, (1995) 'The necessary techniques must be both *rational* […] and *adaptive* in responding strategically to unforseen changes as they occur' (p.36-7). However, what is *rational* when one is overwhelmed by the complexity, unpredictability and uncertainty of change. Planning, in times of turbulence (or transition), acts reactive and therefore is not able to coordinate and integrate developments. A fundamental shift in the way of considering spatial change towards non-linear, partly autonomous spatial evolution, could improve the planner's capability and *rationality* to deal with transitions. To better understand the peri-urban changes distinctive for transitions, distinguishing interrelated functional, organisational, and institutional dimensions and macro, meso, and micro levels of change could be helpful. This division is further explained in chapter two.

With this introduction of the theoretical context, we have identified the the peri-urban area as a system in which complex relations and changes of rural and urban funcitons are present. Furthermore, we have seen that planning seems not to have fully adapted to the emergence of such dynamic, multi-functional areas. A transitional, or non-linear, perspective might improve our understanding of fundamental changes in the peri-urban area, and ultimately result in improved planning strategies. The assumptions regarding the complexity and transitional behaviour of the peri-urban area are tested in a case study, which is introduced below.

1.4. Case study: the peri-urban area of Warsaw

This study involves a case study of Warsaw's peri urban area. The case study region is part of the PLUREL[3] research. PLUREL is a European research project, to which this study is affiliated. Governmental institutions of the case study regions are partners in the project. In the PLUREL research five other city regions are participating: Greater-Manchester (UK), Haaglanden (Netherlands), Hangzhou (China), Koper (Slovenia), Leipzig (Germany) and Montpellier (France). Below, a short explanation and motivation of the choice of Warsaw's peri-urban area is given.

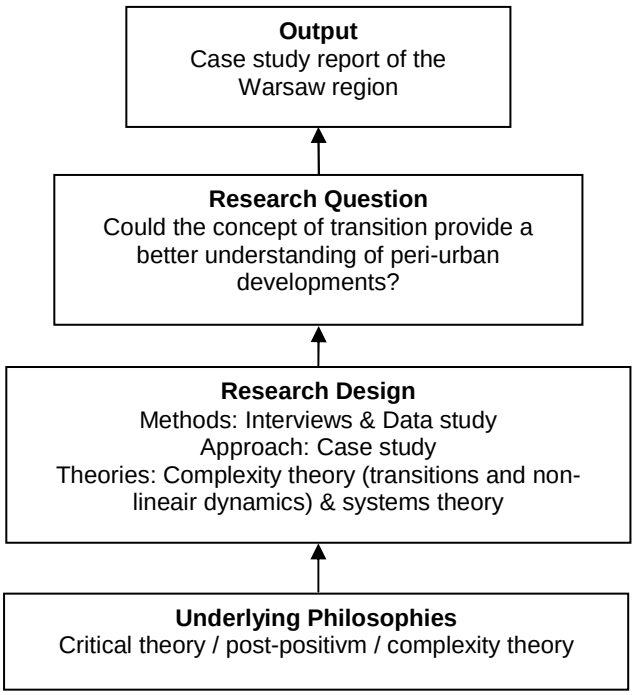
The choice for this case is plural. An important reason is that the Warsaw's peri-urban area has recently fundamentally changed its characteristics, indicating a recent or ongoing transition. The reintroduction of the market economy, simultaneous with the disappearance of communism (1989), can be seen as a major cause. This involved, *inter alia*, a change of the dominant economy in the region – from heavy industries to the global service economy – and a rapid increase in residential developments as a result of socio-economic changes. This political event also included relevant institutional reform and socio-economic change. In short, Warsaw's peri-urban area changed from a rather neglected, extensive agricultural production ground, into an interesting investment area for real estate developers. Furthermore, its role for urban recreation is increasing.

[3] PLUREL is the acronym for Peri-urban Land Use RELationships

Apart from rather distinct functional changes in the peri-urban area, the communist history of the region provides an exceptional insight in the role of planning. This has changed from a dominant role of physical and economic planning to a rather modest one. Interesting lessons might be learned from this case, which is analysed in chapter three to five. Therefore, the case study is focussed on the communist and post-communist era, as introduced below.

After being almost completely destroyed during the Second World War, the city of Warsaw was quickly reconstructed after the decision was made that it would remain the Polish capital. During communism, the role of peri-urban area remained relatively static, despite constant, although gradually declining, population growth of the region. Apart from governmental investments in heavy industries, hardly any economic development took place in the peri-urban area as a result of the centrally planned economy. Consequently, until 1989, the economic function of the peri-urban area was largely limited to extensive agricultural production and heavy industries. With the reintroduction of the market economy and related socio-economic changes, deindustrialisation of the peri-urban area took place, along with a rise of post-industrial developments. The peri-urban area became the location of residential, retail, and service economy developments. As a result, spatial structures and functional relations in the region changed significantly. In order to enhance the cohesion of regional peri-urban developments, one is on the verge to create a regional governmental layer (Warsaw Metropolitan Area). This is expected to enhance the robustness and sustainability of contemporary peri-urban developments.

Figure 1.2: Methodological overview



1.5. Methodology

As mentioned above, the focus of this study lies on the analysis of the development of Warsaw's peri-urban area. The region is studied in depth, using qualitative methods. The objective is to analyse which case-related developments caused the fundamental changes in the peri-urban area. Furthermore, the question was raised whether this process could be further understood by using the concept of transition and whether this could result in a new perspective on spatial planning strategies.

The study is composed of several layers (Figure 1.2). The foundation layer of this research consists of the philosophies on which the research design is built. The underlying philosophies are discussed in Appendix A. Based on this philosophical framework, a theoretical understanding of rural-urban relationships and of the concept of transition are created. This results into a theoretical research of the features of the urban fringe, complex systems, and transitions (chapter two). Empirically testing the theory involves the case study. The case study analysis provides a better understanding of the concept of transition in peri-urban areas

and the co-evolution of spatial planning. It also generates valuable feedback used to improve the theoretical framework. The case study approach is an intensive approach of one specific case or a few cases in its real-life context (Yin, 2003). The primary aim is to understand processes and relations within the region of Warsaw, and with its context. Secondly it is used to compare some general developments with other case study regions of the PLUREL project. Of the latter the results can be found in a forthcoming PLUREL report produced by co-production of researchers of the Faculty of Spatial Science, University of Groningen. In Appendix B the research design is further elaborated on.

To understand the unique relationships within the case study region, and with its context, a qualitative research has been conducted, supported with quantitative data where possible. To obtain the required information of the case study regions, the network of PLUREL has been employed. Interviews have been conducted with key stakeholders, who were approached using a 'snowballing' method starting within the PLUREL network. In Appendix C the research techniques and validity of the case study will be described more extensively.

1.6. Structure

Having explained the relevance, goals and methodology of this study, we are ready for an elaboration on the theoretical framework, which is given in the following chapter. Relevant theories concerning rural-urban relationships, complexity, transitions, and changes in spatial planning are discussed here. Chapter three analyses the contextual changes of Warsaw's peri-urban area. The related fundamental change of Warsaw's peri-urban area is analysed with the use of the concept of transition in chapter four. Two micro cases located in the peri-urban area of Warsaw are presented in chapter five. In chapter six, the synthesis, the relevance of the concept of transitions is reconsidered. In the final chapter, chapter seven, possible implications of a non-linear perception of spatial development processes are presented, including several (theoretical) recommendations.

Chapter 2: Theoretical Framework

Marc Beeftink & Ward Rauws

2.1. Introduction

The central theme of this study is whether non-linear thinking can provide a better understanding of the development of peri-urban areas. More fundamentally: can spatial development be seen as linear progression or is an additional perspective useful to provide a framework for developments within a changing context and uncertain causality? Does the interpretation of peri-urban areas as a *complex adaptive system* contribute to a better understanding of complex, time related, changes? These fundamental questions provide the theoretical challenge of this study and aim for possible new insights to emerge. Insights in non-linear changes, which are neither commonly accepted nor fully understood. In this chapter an overview of the theoretical context in which this research is embedded is provided. First the theoretical issues concerning the urban fringe are described. Second, the role of complexity theory, especially the suggestion of a class IV system, in this research will be explained. Third, the theoretical understanding of the related and crucial concept of transition is further enhanced. At last, the connection with spatial planning is theoretically explored.

2.2. Rural-urban relationships

Due to the increased complex character of rural-urban interactions through the years, the peri-urban area has emerged as a landscape with its own identity. Peri-urban areas are mostly dynamic zones with a high level of integration of urban and rural functions. Because of the increasing importance of flows, the location of activities becomes subordinate in spatial organisation (Lim, 2005). Dynamic 'in between' areas such as the peri-urban area are often more capable of adapting to this process, and therefore have to be considered as essential areas for providing a better understanding of the spatial development (Hudalah *et al*., 2007). Higher accessibility, lower land prices and an attractive environment are examples of locational considerations in favour of peri-urban areas.

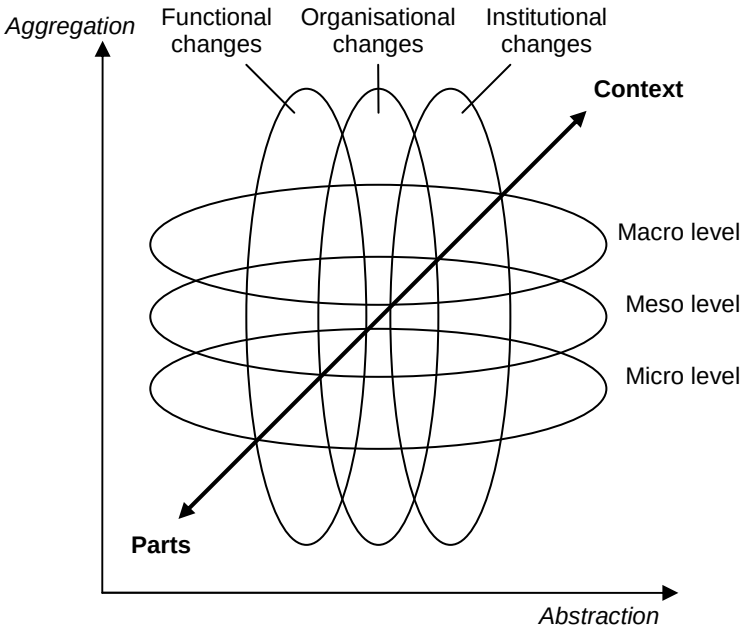
A problem coming along when dealing with peri-urban areas is the question of their delimitation. Since the fringe in itself can be seen as a fuzzy transitional zone, it depends on the chosen definition where the peri-urban area starts and where it ends. Although not further defining the object of this study might lead to an indistinct picture of the peri-urban area, this does right to the fuzziness of such areas. In order to try to paraphrase the typology, the typology of Hudalah (2007) can be of use: the peri-urban area can be seen as *potentially*, because of possible urbanisation; *partly*, regarding the multifunctional use; and *predominantly*, due to the location in the zone of influence of an established city. Above all, the peri-urban area can be characterised as an in-between area with a fuzzy spatial organisation and potential for change. However, we should not view peripheral areas as zones representing disorder, but as a place where new forms of spatial developments occur (Foot, 2000). Because of the increasing complexity of the rural-urban relationships a framework is required to understand these interrelated processes.

According to Bertrand & Kreibich (2006, p.7) rural-urban relationships can be divided in structural and functional relations: 'Structural relations deal with how land is used, urban organisation and the spatial

distribution of the population. Functional relations refer to socio-economic processes concerning diversification of land and the interconnections between various local functions'. Current challenges in urban regions include dealing with urban pressure in peri-urban areas; decreasing relevance of traditional agriculture; the threat of high valued nature; and coordinating multiple, integrating functions in the peri-urban areas (Hidding, 2006). Consequently, both new functional and structural relations are coming into existence.

Furthermore, urban-rural interactions have to be considered as multilevel processes (McGranahan *et al*. 2001). On the micro level, elements of the transition process are important, meso changes influence the whole peri-urban area and on the macro level contextual fundamental change occurs. To allocate the different changes in the peri-urban area, Hudalah & De Roo (forthcoming) suggest regarding the rural urban changes in a multilayered way, adding three interrelated dimensions (functional, organisational, and institutional) to the macro, meso and micro levels (see Figure 2.1).

Figure 2.1: Multilayered changes in rural-urban transitions



Derived from Hudalah & de Roo, forthcoming

Functional changes are ranging from physical changes (e.g. land use and infrastructural changes), urban and regional dynamics (e.g. population, economy and employment changes), to catastrophic events (e.g. war and disasters). Organisational changes concern changes of actions, cooperation and coordination of influencing stakeholders/actors (De Roo & Voogd, 2004). They consist of economic actors (e.g. real estate developers), political actors and governments, and non-governmental actors (e.g. environmental organisations). Finally, institutional changes exist of altering frameworks of meaning and rules of conduct. They consist of shifts in cultural values, formal and informal rules (e.g. new legislations and policy frameworks), and ideological forces (Hudalah & de Roo, forthcoming). A transition in the peri-urban area involves interrelated fundamental changes on every part of the multilayered spectrum. The complex relations between the several elements of the peri-urban system make it impossible to present clear causal explanations.

Although functional, organisational and institutional elements are often interrelated, they do not always change at the same speed (Rotmans *et al*., 2001). Organisational changes, such as an inter-communal cooperation, are probably more effective when embedded in a corresponding legislation framework. However, often such cooperation exists long before institutional frameworks are adapted, and sometimes vice versa. Also the scales of developments play a part in these situations. For instance, in the case of Warsaw's peri-urban area, individual actors (micro level) anticipated much quicker on the fall of communism (macro event) than the system as a

whole (meso level). As can be extracted from this simplified example above, the multilayer perspective could be useful to identify different changes and increase comprehension of the interrelated aspect of transitions. The next section provides an extensive theoretical background of the concept of a *complex adaptive system*, which forms the foundation of the concept of transition.

2.3. Systems theory and non-linear dynamics

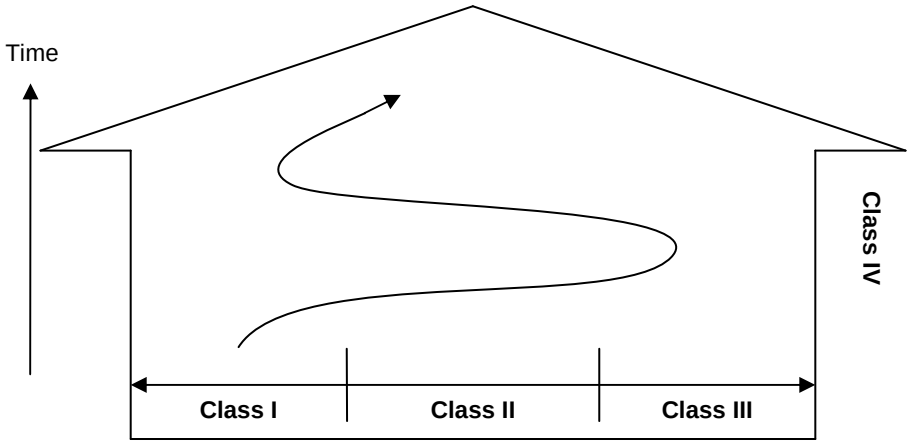
Systems theory offers a framework for understanding urban-rural relations, as is expounded below. Depending on the context, several classes of systems are distinguished. In class I, *closed systems*, the context is relatively stable, or not of influence on the system, and the effect of interventions is easy to predict. In a system perceived as class I, it is advised to govern based on a technical rational approach. Decision making could be generic and centralised, typically known as blueprint planning. In class II systems, or *circular feedback systems*, the context is of more importance and a number of stakeholders with various interests are involved. Because the outcome of a process within the realm of class II system is less predictable than in class I systems (De Roo & Porter, 2007), the possibility of feedback is advised to be included in decision making. To deal with uncertainty the scenario approach is an option. Besides the content of the interventions, a focus on the process is included in class II systems as well. Class III systems or *open network systems* are characterised by an extensive influence of the context. In contrast with class I and II systems, which are relatively stable, class III systems are dynamic or chaotic. Remote causality and the involvement of many participants' opposing interests make it hard to predict the outcome of interventions in such systems. In a planning process with various stakeholders consensus building is essential; governing is replaced by 'governance'. Together, multiple goals are tried to be reached. A communicative approach seems to be the most appropriate approach to deal with issues in these systems (De Roo, 2003).

Out of class I to III systems the suggestion of class IV complex systems or *non-linear adaptive systems* emerges. Comparable with class III open network systems, the context is expected to be of influence. An important difference is the assumption that the context is not stable, as it is in class III systems, but changing. Non-linear adaptive systems are characterised by co-evolution, path dependency and emergence (Hudalah & De Roo, forthcoming; further reading Batty, 2005; Rotmans *et al*., 2001; Rammel *et al*., 2007; Sydow *et al*., 2005). This restrains that system-interrelations are changing between stable and dynamic, because of the influence of the context and causality are changeable (see Figure 2.2). In complex adaptive systems, it is vital for planning to anticipate on autonomous processes of adaptation, which is further elaborated on in section 2.6. Time becomes an important factor, as the system and its context are continuously changing, therefore it seems that planning should change as well.

Consequently, the focus of this study is to improve our understanding of the conditions under which these class IV, complex adaptive systems behave. This is an essential different level of understanding than that of class I to III systems, which are rather clearly understood, enabling us to formulate rules of behaviour and focus on understanding the consequences of interventions. In this study, peri-urban areas are being seen as class IV, complex adaptive systems. This involves the following assumptions: different domains and levels are interrelated; the functioning and situation of the urban fringe is changing over time; and peri-urban areas have

the ability to survive because of the feature to renew and adapt to changing a context. One crucial element of adaptation is understood as transition. The following section further explores the concept of transition.

Figure 2.2: A schematic representation of the four classes of complex systems.



2.4. Transitions

A transition can be defined as a fundamental change within society, which evolves continuously (Rotmans *et al*. 2001). To distinguish a transition from 'normal' growth or a maturing process, Levy (1986) employs the terms 'first order change' and 'second order change', similar to Smith (1982), who uses morphostasis and morphogenesis. These are notions originating from biology. Morphostasis, first order change, deals with shallow changes and with change resulting of the natural maturation process. This progression has a high level of predictability. Morphogenesis, second order change, is defined as 'a form that penetrates so deeply into the genetic code that all future generations acquire and reflect those changes. In morphogenesis the change has occurred in the very essence, in the core, and nothing special needs to be done to keep the change changed' (p.318). A transition is a change of the 'core' of the system and results in system innovation next to system improvement (Rotmans *et al*., 2001).

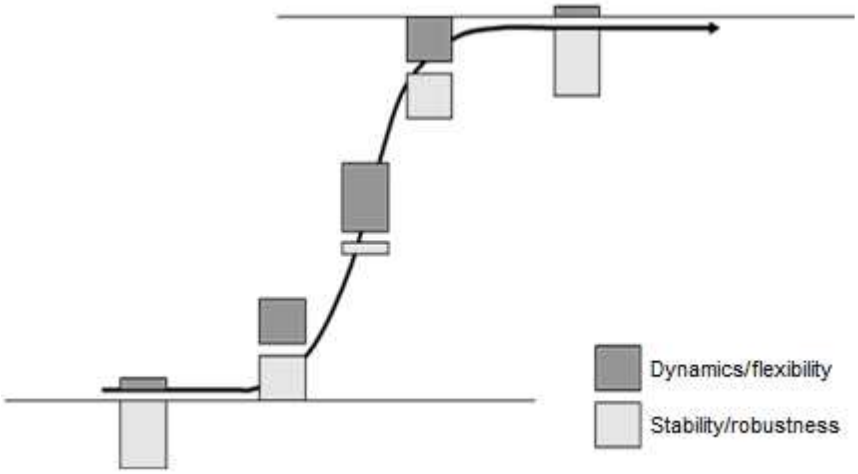
When a transition takes place, it could develop and vary in speed, length and scope. Because of these uncertain directions, a transition's future is ambiguous (Rotmans *et al*., 2001). Levy (1986) indicates a number of characteristics of the second order change (transition): it is a multidimensional, multilevel, qualitative and irreversible process. A transition can only be understood when considering the multidimensionality of the process, because it is a mix of social, economic, cultural, technological, and ecological changes, often with physical consequences. Developments in different domains pass on in different speeds. For example, ecological processes tend to adapt slower than economical processes (Rotmans *et al*. 2001). The multidimensional process of fundamental change, involves changing societal needs which could result in new strategies, changing behaviour of actors, and sometimes in a new framework of understanding (Cummings & Worley, 2001; Levy, 1986).

From the systems theory comes the idea of a system existing of stocks and flows, introduced by Forrester (1961; 1969). 'Stocks are properties of a complex system that change relatively slow (with regard to total volume) over a long period of time. […] Flows are aspects that change relatively quickly in the short-term and reveal the relationship between stocks' (Rotmans *et al*., 2001, p.4). Stocks and flows can be both quantitative and qualitative notions. Stocks, or robust elements, are for example cultural identity, political ideology, or fixed

assets such as real estate. Flows, or dynamic elements, are for example the GNP, migration patterns, the increase of the housing stock or behavioural changes.

Unlike the Class I to III systems, which are assumed to be stable, the balance between dynamic and robust elements of Class IV systems is expected to be altering. During a transition, the system's relative stability is replaced by high dynamics, to become relatively stable again, once the transition process is finished, as illustrated in Figure 2.3. In a transition the stocks change relatively slow and the flows change relatively quickly. The stock developments determine to a great extent the time span and direction of the entire transition (Rotmans *et al*., 2001; Rotmans & Kemp, 2003). When flows reinforce each other (or spread like an epidemic) they can reach a tipping point, the point of no return, 'when everything can change all at once' (Gladwell, 2000, p.9). During a transition dynamics or flows are at the highest at the tipping point, during the stable phases the dynamics or flows are at the lowest in the transition (De Roo, 2008a).

Figure 2.3: Shifting equilibrium of stable and dynamic elements



Modified from De Roo, 2008a

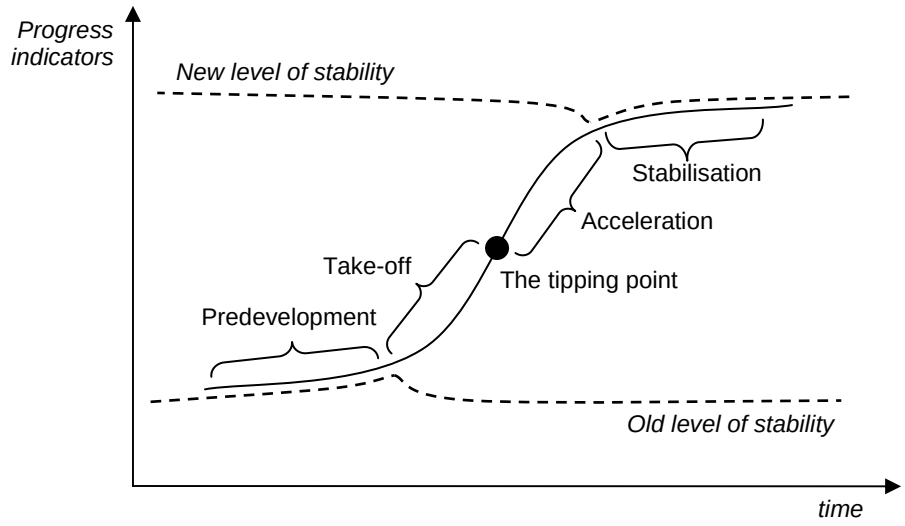
Transitions can occur due to several reasons. According to Breman & Mundle (1991), transitions could be triggered by macro processes, such as a changing role of the state or the dominant ideology which guides state action, a shift in the balance of society classes, the economic importance of natural recourses, or the availability of a new technology. For example, Fishman (1987) introduces the concept of the technoburbia, 'a dominant new urban reality that can no longer be considered as suburbia in traditional sense' (p.77). Jackson (1985) mentions the increasing car mobility and the drive-in culture as possible cause of important changes in the urban fringe. Ichikawa *et al*. (2006) distinguish different possible causes of transition in their research of the urban fringe of Tokyo. In general, they distinguish changing socio-economical conditions and more specific common use of fossil fuels and chemical fertilizers, increased awareness of nature conservation, shifting agriculture and urbanisation. To conclude, several macro processes could influence transitions.

Although macro processes could be identified as drivers of a transition, the system's conditions are relevant as well. Consequently, different types of external and internal factors can be distinguished, such as the divide made by Levy (1986). He distinguished four conditions for transition: (1) permitting conditions: aspects of the internal system which allow a transition to occur. For example a surplus of resources and willingness of the dominant group to change; (2) enabling conditions: external aspects which provide a breeding ground for transitions, for instance changing (inter)national policies: (3) precipitating conditions: immediate causes such as a crisis, growth

or decline trends and dissatisfaction with internal and external actors. Finally, (4) triggering events. This could be environmental calamities or opportunities, mass movements and leadership change.

If a transition occurs, four phases could be distinguished between the old and new level of stability (Rotmans *et al*., 2001). In the predevelopment phase the complex adaptive system is in a dynamic equilibrium, however autonomous processes are emerging under the surface, but not yet at the system level. During the take-off phase the autonomous processes reinforce each other and are together causing the system to get out of balance, 'the state of the system begins to shift' (Loorbach & Rotmans, 2006, p.190). After the tipping point, the acceleration phase takes place, during which fundamental, irreversible and multidimensional changes take place on different aggregation levels. The system is still out of balance. Finally, the stabilisation phase is distinguished, during which the speed of change decreases and a new level of dynamic equilibrium is reached. The system is embedded in a new context. The phases of a transition can be seen in Figure 2.4. The tipping point, also shown in Figure 2.4, indicates the moment when interrelated changes, the drivers behind the transition, reach a critical mass. After this point, the point of no return, radical change becomes more than a possibility and suddenly change becomes visible for everyone (Gladwell, 2000). The tipping point could be reached quicker because of a triggering event, through which the critical mass arises.

Figure 2.4: A basic representation of transition process



Rotmans at al., 2001, p.17; Hudalah & De Roo, 2007, p.5

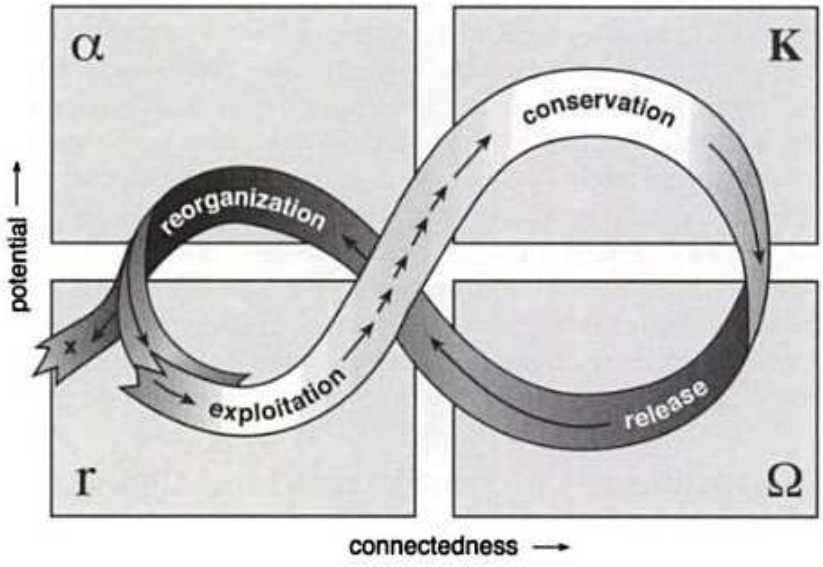
By using the concept of transitions in peri-urban systems, we might be able to understand non-linear spatial developments better and ultimately help defining new planning strategies. Therefore identification of transitions in spatial development is of importance. Furthermore, understanding of interrelated conditions which determine the evolution of transitions in peri-urban areas is useful. However, transition is not the only model covering non-linear fundamental change in complex adaptive systems. The next section introduces the concept of panarchy, an alternative model of fundamental, non-linear change. The model might enhance our understanding of non-linear change, transitions in particular, by introducing new concepts. Furthermore, it might increase our understanding of changes in the case study region. Ultimately, it is used to enhance the model of transition.

2.5. Panarchy

As explained in the first chapter, the concept of transition, as an understanding in complexity theory, provides the framework for this study. However, to increase the understanding of non-linear dynamics of complex adaptive systems, an interesting notion is introduced by Gunderson & Holling (2002): panarchy. The model of panarchy aims to understand the resilience of a system by distinguishing potential for change and connectedness. The concept will be explained below and might provide a broader perspective on non-linear development and sustainability of complex adaptive systems. Several notions might form welcome additions to our understanding of transitions. Furthermore, it might shed a different light on our case study analysis.

Holling describes panarchy as 'the process by which [ecological and social systems] grow, adapt, transform, and, in the end, collapse' (2004, p.1). Important similarities with the concept of transition can be identified, as panarchy is also used to describe fundamental transformations of complex adaptive systems, assuming different stable and dynamic phases through which complex adaptive systems evolve (Loorbach & Rotmans, 2006; Rotmans & Kemp, 2003). As illustrated in Figure 2.5, four phases could be distinguished by changes in connectedness and potential for change. These notions and the four phases are explained below.

Figure 2.5: Panarchy: the four stage adaptive cycle



Gunderson & Holling, 2002, p.34

When moving along the various phases, changing position with respect to the x-axis and y-axis, the levels of connectedness and potential change accordingly. In what Gunderson & Holling call the 'front loop' (the **r** and **k** phases), the increasing potential indicates gradual accumulation (of for instance resources, or efficiency). The relatively high potential in the **k** phase is released during the **Ω** phase (Gunderson & Holling, 2002). Entering the 'back loop', potential has a slightly different connotation. Here it seems to indicate the possible futures of the system, or in Gunderson & Holling's words: 'potential for other uses' (2002, p.35). During a reorganisation, the choices that are made, increasingly determine the future of the system, hence the decreasing potential at the end

of the reorganisation phase. Similarities can be found with the notion of path dependency as explained by Sydow *et al*. (2005).

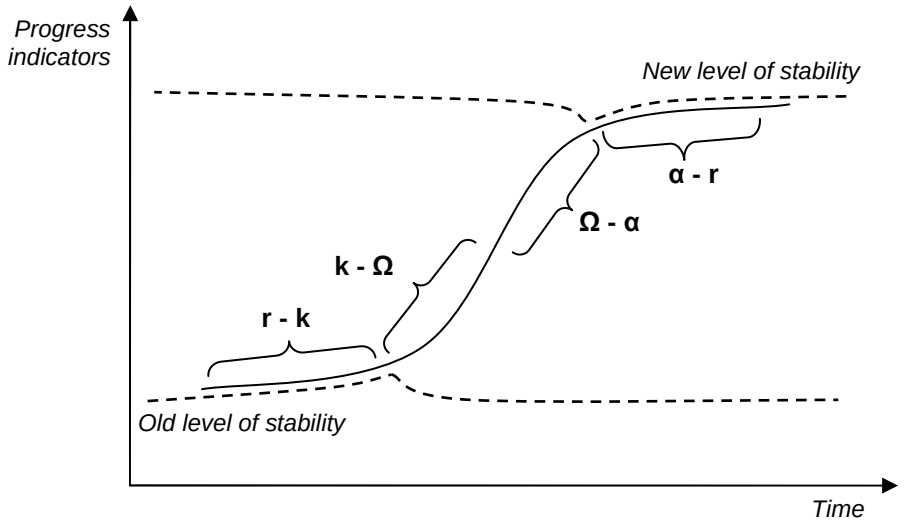
Similar to the potential, during the 'front loop', internal connectedness moves from relatively low to relatively high. A low level of connectedness is generally associated with 'diffuse elements loosely connected to each other whose behaviour is dominated by outward relations and affected by outward variability' (Gunderson & Holling, 2002, p.34). Meanwhile, a high level of connectedness is associated with 'aggregated elements whose behaviour is dominated by inward relations among elements of the aggregates, relations that control or mediate the influence of external variability' (ibid.). In other words, connectedness can be seen as an indicator of the flexibility of a system to deal with change; the lower the level of connectedness, the more flexible a system is to contextual influences. An interesting conclusion which could be drawn is large potential of planners' interventions during the reorganisation phase, when the connectedness is low and the potential for future uses is high; small changes might have big effects. In contrast, during the conservation phase, when both the connectedness and the accumulated potential are high, large efforts might have little effects.

When moving along the cycle, starting at the bottom left of the 'front loop', one starts at the exploitation phase (**r**). This phase refers to the ecological concept of rapid colonisation of a disturbed system: the r-strategy of species. In social systems it could be seen as equivalent to the entrepreneurial market (Gunderson & Holling, 2002). While the system is maturing, the connectedness and potential of the system increases. When moving further to the top right, the conservation phase (**k**) follows. This refers to the ecological concept of slow accumulation and storage of energy and material. In social systems this could be perceived as increasing bureaucratic hierarchy (Gunderson & Holling, 2002). During the conservation phase increasing experience and wealth can be built up, while connectedness increases. This can lead to 'the paradox that accumulated increases in wealth and efficiency also combine with an increased narrowness of view and a rigidity that make it difficult to agree on how to respond differently to new challenges' (Holling, 2004, p.6). Moving further along the cycle, it becomes apparent that the system inevitably reaches a point of internal over-connectedness. When this occurs the system becomes impenetrable to outside influences, causing the complex system to lose its adaptive capacity (Higgins & Duane, 2008). When a disturbance of the system occurs at that moment, such as a forest fire in ecological systems or a regime change in social systems, this leads to a release (**Ω**), a period of creative destruction[4] (Gunderson & Holling, 2002). It is a period of reorganisation that involves 'the collapse of accumulated connections and the release of bound-up knowledge and capital' (Holling, 2004, p.6). We are now in the 'back loop', moving to the left, reaching a period of reorganisation (**α**); in ecology the transient appearance of pioneer species. In social systems this could be seen as a period of 'innovation and restructuring in an industry or society' (Gunderson & Holling, 2002, p.35). These are processes common in periods following a recession or social transformation.

[4] The notion 'creative destruction' comes from the economist Joseph Schumpeter (1883-1950). In his 1912 *Theorie der Wirtschaftlige Entwicklung* (Theory of Economic Development) he indicated economic-technologic innovation as the main driver of economic and social processes of substitution. (Gunderson & Holling, 2002; Van der Cammen & De Klerk, 2003). A phase of creative destruction can be seen as both necessary and the result of this process of substitution.

A parallel can be found between panarchy and the model of transition (Rotmans & Kemp, 2003). Figure 2.6 visualizes the transition model in comparison with the phases of the panarchy model. During the stable phase of predevelopment, the complex adaptive system becomes increasingly interdependent and interconnected (r - k). The panarchy framework suggests that the administrative rationality [technical rationality] model is the most successful during the r - k phase (Higgins & Duane, 2008). This would affirm the comparison with the r - k phase with a phase of relative stability, such as the predevelopment phase. During the take-off period several autonomous processes reinforce each other, pushing the system away from the old level of stability. According to the panarchy model, the system is over-connected and not flexible enough to change to incorporate the push factors (and) a changing context in this period. The actors in a system might even be actively trying to prevent fundamental change of the system and try to hold on to the old stable level (Holling, 2004). If, at such a moment, a disturbance or tipping point occurs, this will lead to the breakdown of built-up connections, providing opportunities for the construction of a new framework (Gunderson & Holling, 2002). 'The relatively fast period is the stage from release to reorganisation, during which innovation and restructuring take place' (Rotmans & Kemp, 2003 p.13). This is comparable to the acceleration phase where visible structural changes take place and where the old level of stability has irreversibly been abandoned. After a period of high dynamics, potential has been built up and reorganisation (institutional embedding) will take place. The system reaches a dynamic equilibrium and might eventually head for another transition or another loop through the panarchy cycle.

Figure 2.6: The four stage adaptive cycle integrated in the transition progress.



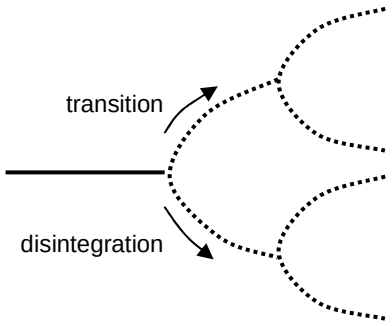
Important differences between the panarchy model and transition model are, first of all, the iterative process of panarchy, while the model of transition does not necessarily indicate that a transition is followed by another. Secondly, the 'creative destruction' in the release period does not seem to match the acceleration phase in a transition. Finally, the panarchy model seems to consider system progression as an endless repetitive process, without system innovation. The latter issue will be discussed first.

The cycle does indicate a closed, repetitive development process and a system could, once it is over-connected, be forced to reorganise after a temporary event, such as a fire in an ecological system, e.g. a forest. If the

external conditions of the system have not changed in respect to the previous reorganisation period, it could very well be that the system will develop in a similar way: no system innovation will take place. However, in social systems, after a tipping point, it is very unlikely that the external conditions are the same. The tipping point could even be a result of interplay between internal and external processes. A changed contextual situation restrains that after the release and reorganisation period, in which innovation takes place (Gunderson & Holling, 2002), the system has evolved to another (higher) level. Holling (2004) mentions three worldwide examples: agricultural settlement by hunter-gatherers, the industrial revolution and the current 'global interconnected communications-driven revolution' (p.7).

Concerning the other mentioned differences between panarchy and transition we introduce the concept of bifurcation. Bifurcation, also a notion of complexity theory, could be seen as a concept upon which the model of transition is based. In the concept of bifurcation both transitions and disintegrations are possible, as shown in Figure 2.7. Fundamental change (Silva, forthcoming) is about the ongoing process of reaching new, temporary levels of stability by complex systems. In case of a bifurcation, the need for change is so high a take-off occurs. This results in 'a causal pattern evolving that tracks a particular type of behaviour building on social mechanisms by which the pattern is likely to be reproduced over a certain period of time' (Sydow *et al*., 2005). Series of transition or destruction are the consequence. Destruction or disintegration, as will be referred to in this study, is a transition to a lower level of stability (see Figure 2.7).

Figure 2.7: Bifurcation (modified from Crawford, 1991, p.1001)



Having bifurcation in mind, the parallel with the iterative process of panarchy is quickly discovered: one bifurcation (transition or disintegration) is necessarily followed by another, similar to the cyclic process of panarchy. Furthermore, Gunderson & Holling (2002) argue that improvement (innovation and restructuring) happens after the 'creative destruction' (Ω) period, namely in the reorganisation (α) period. If the release (Ω) period and reorganisation (α) period lead to a higher level of stability one could speak of a transition. If, however, the level of organisation turns out to be lower, it could be compared with a transition to a lower level: disintegration. Therefore, the panarchy cycle should not be considered as a closed process, but as process that includes progression and innovation, or the opposite.

With the use of the panarchy model three additions could be made to our understanding of non-linear dynamics. First of all, connectedness can be considered an indicator of the flexibility of a system. Secondly, besides processes of progression and transition also processes of destruction and disintegration can occur. Finally, transition is a feature that occurs continuously in complex adaptive systems, resulting in constantly changing characteristics of such systems. Consequently, the planner will permanently have to adapt its strategies to the system conditions, in order to remain effective. This necessary co-evolution of planning as a response to non-linear change in complex systems is attended in the next section.

2.6. Co-evolution of spatial planning

Since this study tries to enhance our understanding of non-linear spatial developments in order to indicate possible consequences for spatial planning, this section first defines how we see planning. Next, a changing (perception of) reality and the changing role of planning is elaborated on, involving the subject of non-linearity. Finally, in order to better understand the relation between planning its object of study, in this case the peri-urban area, a distinction between three dimensions of planning is made, in accordance with the multilayered perspective (see Figure 2.1).

The role of spatial planners has changed over the last half century. Instead of an objective expert, since the 1960s, the planner is regarded more as an advisor as well as a participant in the planning arena (see Kaiser *et al*., 1995; Allmendinger, 2002; De Roo & Voogd, 2004). Due to a changing society and changing philosophical insights, the undisputed knowledge and objectivity of the planner is being challenged. De Roo & Voogd (2004) mention the diversity of the roles of the contemporary planners. Allmendinger (2002) emphasises the normative aspect of planning. Apart from a focus on the object of planning (space), and the process of planning, questions about, *inter alia*, the legitimacy and subjectivity of planning have emerged. Before elaborating on these themes, we need to enhance our understanding of (the role of) planning.

Voogd (1999) defines spatial planning as 'the systematic preparation of policy making and implementing acts, aimed at intentionally intervening in spatial arrangements, and the organisation of these interventions, with the purpose to maintain or improve spatial quality' (p.5)[5]. De Roo & Voogd (2004) comment on this definition that the *intentional* element is significant: 'we think before we act' (p.13)[6]. De Roo & Voogd (2004) and Hidding (2006) notice that Voogd's definition does not tell who environmental quality is for. Hidding argues these should be 'public goals'[7] (p.91). Although we agree that planning should support societal progression, it is problematic to define which goals could be seen as public goals with social benefits, and which goals would only be profitable for an exclusive group of the society. Spatial development is a multi-actor process with many different interests. Furthermore, Hidding sees spatial planning as 'intervening in the process of mutual adjustments of space and society'[8] (2006, p.91).

Thus, spatial planning is defined here as '…intervening in the process of mutual adjustments of space and society…'[9] (Hidding 2006, p.91), '…with the purpose to maintain or improve spatial quality' (Voogd, 1999, p.5)[10]. However, some issues can be identified. Planning involves public as well as private actors. Hidding

[5] Translated from Dutch: 'de systematische voorbereiding van beleidsvormende en –uitvoerende handelingen, die gericht zijn op het bewust interveniëren in de ruimtelijke orde, en op de organisatie van deze interventies, ten einde ruimtelijke kwaliteiten te behouden en waar mogelijk te verbeteren' (Voogd, 1999, p. 5).
[6] Translated from Dutch: 'we denken voordat we doen' (De Roo & Voogd, 2004, p. 13).
[7] Translated from Dutch: 'publieke doeleinden' (Hidding, 2006, p. 91)
[8] Translated from Dutch: 'interveniëren in het proces van wederkerige aanpassing van ruimte en samenleving' (Hidding, 2006, p.91)
[9] Translated from Dutch: '…interveniëren in het process van wederkerige aanpassingen van ruimte en samenleving…' (Hidding, 2006, p. 91)
[10] Translated from Dutch: '… ten einde ruimtelijke kwaliteiten te behouden en waar mogelijk te verbeteren' (Voogd, 1999, p. 5).

(2006) argues that their goals should be legitimised with a democratic decision-making process. Therefore, paying attention to the decision-making process is required, next to the content of the question at hand. How to balance the process- and content-oriented strategies could be derived from the type of system that is dealt with. A closed linear system (Class I) would involve a technical, content related approach (blueprint planning), while an open network system (Class III) would involve a communicative, process oriented approach (De Roo, 2003). While in Class I systems, causality is clear and the future and effects of interventions are highly predictable, in Class III systems, causality is remote and the future and effects of interventions are highly uncertain (De Roo, 2003; Mitchell, 2002). Creating a common future vision in a Class III system, with a communicative process, might increase the likelihood that such a future becomes reality (Mitchell, 2002). However, which public and private actors should be involved in the decision-making and goal-setting process remains a highly (inter-) subjective and case-related matter (De Roo, 2003). Therefore, the goal (e.g. 'public interest' or 'environmental quality') is a unique, case-related issue.

When dealing with complex adaptive systems (Class IV), such as the peri-urban area, a changing context, adaptation of the system, and autonomous processes are notions influencing the effectiveness of governmental interventions (Loorbach, 2007). Autonomous adaptation and self-organisation within a complex adaptive system might even make interventions unnecessary or contra-productive and therefore have to be acknowledged. A co-evolutionary perspective could be helpful understanding interaction between society, space and spatial planning (see Rammel *et al*., 2007; Rotmans *et al*., 2005).

A fundamental question remaining, is whether spatial interventions are intended to accomplish the needs of society, or to shape society to an idealistic model? Hidding's 'mutual adjustments of space and society' could lead to the conclusion that both are possible. In literature on public housing, for example, it is acknowledged that on the one hand public housing policy is changed to satisfy the society's needs, on the other it is used to shape society: 'social engineering' (see Ekkers, 2006; Kleinhans, Velboer & Duyvendak, 2000). A clear example of the latter is the attempt of communist governments to shape an egalitarian society, by means of equal housing and industrialisation (Crowley, 2003).

However, according to Kaiser *et al*. (1995, p.36) 'rather than leading events, in turbulent times planners are constantly responding to events'. Instead of shaping society through spatial modifications, the spatial planners' job is reduced to accommodating the desires of society in space. Moreover, while turbulent times lead to more uncertainty about the future, the job of the spatial planner is to recognise trends which might become relevant in the future (Kaiser *et al*., 1995): 'the necessary techniques must be both rational […] and adaptive in responding strategically to unforeseen changes as they occur' (p.36-7). Planning needs to respond to change, is what can be deducted from this statement.

In order to improve the ability of spatial planners to deal with turbulent times, e.g. a transition, strategies are needed that will bring spatial planning beyond behaving reactively, and acknowledge the limits of social engineering through planning. A non-linear perspective, with the explicit recognition of autonomous adaptive processes in society and space, could be of help when setting goals and deciding about spatial interventions in

complex adaptive systems. The role for the planner would be to permanently adapt its strategies to a changing reality, which is understood as co-evolution.

To improve our understanding of spatial planning and its relation with the complex adaptive system, it is important to identify several elements. Within planning the following interrelated dimensions could be distinguished: institutional, organisational, and functional. This will be exemplified with a quote of Kaiser *et al*. (1995, p.15-6):

> 'Elected and appointed policymakers at all […] levels of government seek to influence land use in different ways, depending upon the problem of concern. […] The content of intergovernmental land policy changes over time, as the perceived problems change. While land policies come and go with social change, land policy institutions are more stable. The structure and procedures of […] legislatures change infrequently. Government agencies concerned with land use, […] change more frequently but typically on a time scale measured at least in decades. Institutional stability, however, can mask major policy swings'.

The quote points out that not every dimension of planning adapts as quickly as the other dimensions. Typically, the content of policy changes as perceived problems change; policy institutions, however, are more stable. Governmental agencies are expected to adapt faster than institutions, but slower than the content of the policy. Furthermore, the multilayered perspective (Figure 2.1) provides a framework for a division within planning, as planning is considered to be an inseparable part of society. Therefore, planning is divided in three interrelated dimensions: functional, organisational and institutional (Figure 2.8):

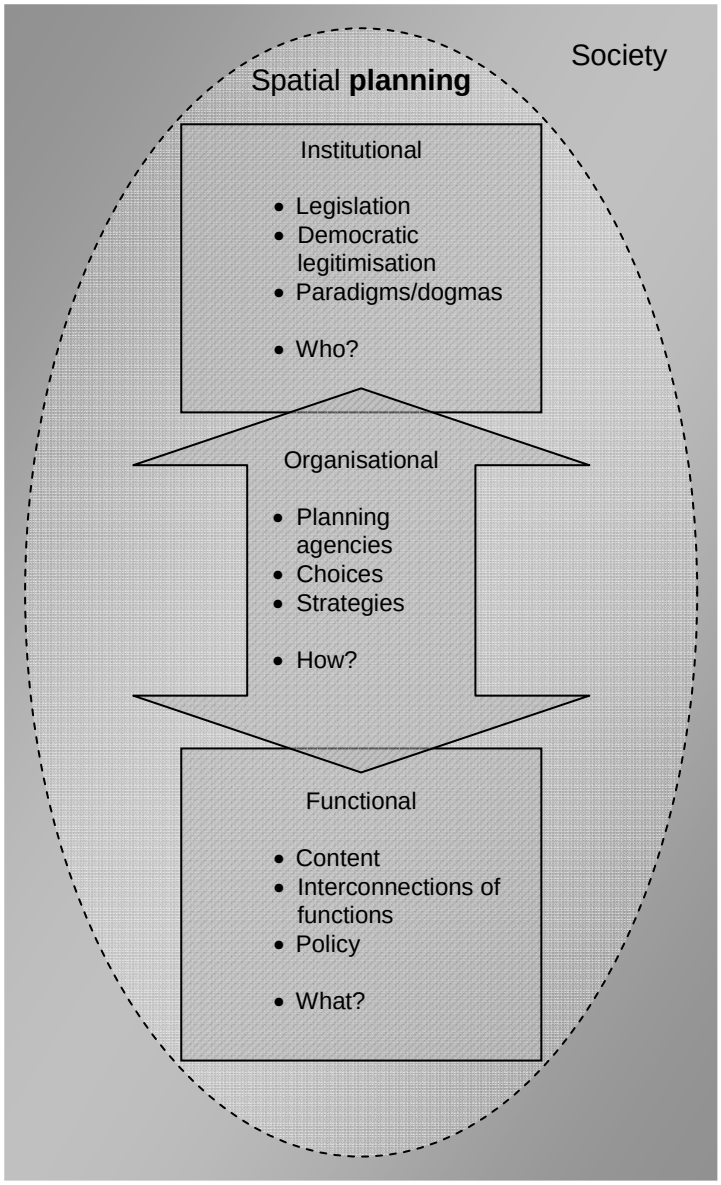
Functional: relates to the object or content of planning: physical or social reality. This dimension is goal-oriented: what should be achieved?

Organisational: refers to the actors, stakeholders and shareholders, and the choices they make. Furthermore, it refers to the rationalisation of these choices. This dimension is addressed with the 'how' question. How to reach a goal?

Institutional: also refers to actors and institutions, but also to cultural values, scientific paradigms and tenets. Furthermore, it refers to the democratic legitimisation and the 'who' question. Who should be involved? (De Roo, 2003)

Naturally, the chosen division in dimensions will not appear as clear-cut in the case study as represented in a model. Often it will be difficult to describe planning actions in just one of these terms, as many changes in spatial planning will consist of more than one dimension. Nevertheless, this division is assumed to be of assistance, when trying to identify interrelationships between spatial planning and spatial transitions and improve our ability to identify 'mismatches' between planning and the evolving peri-urban area. Challenges, such as poor coordination and integration, might be better identified when trying to explicitly distinguishing different dimensions of planning. With this model, based on the case study research, we will try to make recommendations for spatial strategies.

Figure 2.8: Spatial planning, as a part of society, divided in an institutional, organisational and functional dimensions.



To draw a conclusion, urban and rural are becoming more integrated and urban-rural relationship more complex. This study proposes a framework for non-linear spatial evolutionary perspective of the urban fringe. Increasing complexity of spatial processes is considered as a reality and the aim is to contribute to a new perspective that could result in planning strategies that are able to deal with non-linear processes.

2.7. Conclusion

Peri-urban areas can be seen as complex adaptive systems, which evolve in a non-linear way. The introduced concept of transition provides a framework for fundamental change within these systems. A transition is considered to be a qualitative, irreversible, multi-level, multi-domain and multi-actor process of fundamental change. Four phases of a transition can be distinguished with a changing balance between robust and dynamic elements. With the model of panarchy, the notion connectedness is introduced which could be considered as an indicator of the flexibility of the system to deal with change. In order to analyse the co-evolution of planning within peri-urban areas, institutional, organisation and functional change are distinguished.

The theoretical framework of this study, presented in this chapter, provides a new way to perceive changes in the peri-urban area. When researching the case study regions, this chapter will be a frame of reference. The following chapters present the analysis of the case study region of Warsaw. In chapter three the context of the peri-urban area region is analysed on a macro level, followed by a meso analysis of the peri-urban area in chapter four. Chapter five presents two micro case studies within the Warsaw region.

Chapter 3: Macro developments

Marc Beeftink

3.1. Introduction

Following the multi-layered perspective (Figure 2.1), macro events are interpreted as contextual to the development of Warsaw's fringe and are therefore analysed in this chapter. Since historical events are carried into the future by its institutional, organisational, and physical products (Martin, 2000), the urban history of Warsaw has to be considered in order to understand the subsequent developments of the urban fringe. An overview is given in section 3.2. In the case of the Warsaw region, political events on (inter)national scale were (and still are) closely connected to local and regional spatial policy. Both are discussed in section 3.3. The economic, and interrelated, the demographic context have been drivers of change in the peri-urban area and are therefore elaborated on in section 3.4, respectively section 3.5. In section 3.6 conclusions of the macro analysis are drawn.

3.2. Urban history

Reasoning from the theoretical debate on rural urban relationships, the presence of the city of Warsaw has had a fundamental influence on its surroundings. Macro influences seemed to have partially been channelled through the city to influence the peri-urban area. This section explains the changed role of the city in the region and its altering functional relation with its peri-urban area, through time.

Although the exact facts concerning the origin of Warsaw remain unclear, the foundation of a fortified city – currently the old town – dates from the late 13th or early 14th century. It was located on the high west bank of the river Vistula, where the river could easily be crossed. Due to its central location between the capitals Kraków and Vilnius, Warsaw was chosen as capital of the Polish-Lithuanian Commonwealth (1569-1795) and simultaneously the Polish Crown in the 16th century. This brought administrative jobs and extra investments along, such as the first permanent bridge across the river in 1573 which was, although destroyed and rebuilt several times, strengthening Warsaw's position in the east-west trade (City of Warsaw, 2008; Kaczorowski, 1965; Niemczyk, 1998). By the end of the 18th century, Warsaw's population surpassed the 100,000. From the theoretical perspective it could be concluded that until halfway the 19th century the city had grown substantially, but that it had not structurally changed relation with its hinterland. A divide in rural-urban relations stayed in existence: the city had grown concentric, while the surroundings of the city were characterised by extensive agricultural activities and large forests. The city itself was the centre of politics, crafts, industrial production and trade. An exception to this divide of rural and urban functions were the country-houses and palaces of the notables, built several kilometres outside the city, for instance Wilanów Palace (1696, several kilometres south of the city centre, see also the first micro case in chapter five) and a summer hunting palace in Saska Kępa (1735, east of the river Vistula).

When Warsaw became part of Congress Poland[11] (1815-1915), it lost the status of capital and accordingly its administrative function. Nevertheless, Warsaw became a centre of several industries, such as the metallurgic, textile, and the food industry, producing for an increasing regional market (Kascorowski, 1965). The development (and growth) of the city accelerated after the establishment of the first rail connection with the Upper Silesian coal basin in 1847. The connection was extended to Cracow and Vienna in 1848. This more or less coincided with the abolishment of the customs barrier with the Russian Empire (1851). The combination of factors opened up the opportunity to produce for the Russian market, especially after rail connections were established with St. Petersburg (1864) and Moscow (1871). It resulted in favourable conditions for industrial growth in the city. This became a self-reinforcing process: e.g. the steel producing sector flourished by the increasing demand for rail transportation which had been one of the enabling conditions to begin with. By the end of the 19th century Warsaw was increasingly squeezed by a belt of Russian fortifications, leading to a growing density and a rise in land value in the city (Crowley, 2003; Kaczorowski, 1965). Workers, seeking cheaper accommodation, settled in small towns surrounding Warsaw. Especially in towns with a rail connection with Warsaw, enabling workers to commute to their jobs in Warsaw (Crowley, 2003; Kaczorowski, 1965; Wandycz, 2001). This resulted in a structure of urban fingers along the existing railroads, which is still recognisable today. The implications of these developments for the peri-urban area involve a growth of the functional region, enabled by increased transport possibilities. As a result, urban growth did not take place in Warsaw alone, but on a regional scale. Functionally, suburbs provided the industries in the city with a pool of labour. Extensive agriculture characterised the economic function of rural areas in the region.

After World War I, Warsaw became the capital of the independent Republic of Poland and regained corresponding administrative functions. Furthermore Warsaw became the national centre of culture and science and a national service centre. These economic advantages largely compensated for the economic consequences of the War. Most importantly, Warsaw was disconnected from the large Russian market. As a result large factories had to curtail their production to that of the local and regional market. Nevertheless, the Warsaw region retained its position of one of the largest industrial regions in Poland. Based on the remaining industries and the administrative functions of the capital, a regional network of local and regional service economies came into existence, especially in the 1930s. Although a process of decentralisation could be recognised in between the Wars, the city retained its dominant position in the region (Czarniawska, 2000; Kaczorowski, 1965; Niemczyk, 1998).

The relatively prosperous economic situation in Warsaw contrasted sharply with that of its surroundings and especially the rest of Poland[12]. Agricultural productivity was extremely low due to the stay off of mechanisation. Furthermore, living conditions outside Warsaw were poor, generally without running water, sewage, gas, electricity, and paved roads. This stimulated migration to the capital city (Kaczorowski, 1965; Wandycz, 2001).

[11] Congress Poland, officially named Kingdom of Poland, is the name of one of the three partitions of the later Republic of Poland. Congress Poland, came under Russian influence, the other two partitions were divided among Prussia and Austria (Wandycz, 2001)

[12] The (Second) Republic of Poland (1918-1939) existed out of three parts which had been separated for over one hundred years. In contrast with Congress Poland, especially Warsaw, the other two partitions of Poland had not experienced the Industrial Revolution (Wandycz, 2001).

In the 1920s and 1930s Warsaw was extended with several garden cities. This was possible as the building restrictions near the belt of fortifications had been abolished in 1911 and the city's territory was expanded in 1916. Nevertheless Warsaw became increasingly overcrowded. The overall density of the city rose to 10,000 inhabitants per square kilometre at the end of the 1930s, with densities of 400 to 2,000 inhabitants per hectare in central areas (Malisz, 1987, p.258). The density of the city centre put pressure on the living conditions in the city. Dwellings were overcrowded, roads were congested, residential and industrial functions were partly mixed, and the availability of urban green structures was insufficient (Lisowski, 2002; Malisz, 1987). The excessive concentration in the city led to an early interest among planners in a deconcentration of the city (Kaczorowski, 1965; Lisowski, 2002; Malisz, 1987). More interestingly from a peri-urban perspective, an increasing number of migrants was unable to afford a location in the increasingly expensive city and settled in the surroundings of Warsaw. Investments in the railway system supplied the increasing demand of commuting to Warsaw, in turn attracting vast numbers of non-agricultural population settle in the rail connected suburbs of Warsaw (Kaczorowski, 1965). Consequently, the developing zone around the municipality of Warsaw, up to 30 kilometres from the city centre, showed a higher growth rate than Warsaw in the 1920s and 1930s. Theoretically, this development increased the functional relationship of the city with its surroundings. However, since the suburbs attracted particularly inhabitants with an urban lifestyle, the increase in relationships was primarily urban-urban.

A significant turn in the history of Warsaw came with the almost complete destruction of the city during World War II[13]. The structure of the present day city is largely the result of the reconstruction after the War, which occurred according to the CIAM principles[14] in combination with the dominating socialist ideology. The city centre was seen as the proper place for political, administrative, cultural, commercial, and other public functions. Surrounding the centre, in accordance with the egalitarian ideology, mono-functional residential areas with large, identical apartment buildings were constructed. Industrial complexes were planned outside the city, along the access roads and rail infrastructure, separated from the residential functions with large areas of agricultural or meadow land. The rural areas were meant to function as 'ventilation wedges', a concept coming from interwar planners in Warsaw (Grochowski, 2002; Kaczorowski, 1965; Niemczyk, 1998; Szulczewska & Kaliszuk, 2008). Main infrastructure was directed at the city centre: main roads were widened and new thoroughfares were created, anticipating the increasing use of trams, buses and trolleybuses. The absence of a market economy (section 3.4) led to excessive use of space (Niemczyk, 1998). The decades of planned economy following the reconstruction, caused the city centre to be underdeveloped, in market economic terms[15]. Simultaneously it remained one of the best accessible areas in the region since most regional rail and road infrastructure directed to

[13] The destruction of the city included: all bridges across the river Vistula; 90% of the industries; and 72% of housing units. The surroundings suffered mainly from demolitions of infrastructure and power plants (Kaczorowski, 1965).
[14] The CIAM (Congrès Internationaux d'Architecture Moderne, founded in 1928) principles comprise, among other things, the idea of the functional city. Already before World War II an extensive study named *Functional Warsaw* (1934) was created, influenced by the CIAM line of though, which was partially used as a basis for the post-war reconstruction of the city (Malisz, 1987, see also section 4.3).
[15] The city centre of Warsaw is located in the Śródmieście district. With the reconstruction of the city after World War II the political and administrative point of gravity was relocated to the west, to the Palace of Culture. The area surrounding the Palace currently functions as the Central Business District (CBD) (Bourdeau-Lepage & Huriot, 2002; Niemczyck, 1998; Interviewee D).

the city centre. Nevertheless, the peri-urban area had an enormous unutilised economic potential, since extensive agriculture dominated the land use, occasionally alternated with industrial complexes.

When in 1990 market economy was re-introduced, the city centre was seen as the most prestigious place for international corporations, executing high order service activities (Bourdeau-Lepage & Huriot, 2002). In contradiction to some other European cities with a historical centre intact, there was enough space available. Not surprisingly, peripheral business districts, such as La Défense in Paris, the London Docklands or the South Axis in Amsterdam, have not (yet) been developed in the Warsaw metropolitan region. Although since 1990 a process of decentralisation of office locations is going on, the (international) business point of gravity is still located in the city centre (Bourdeau-Lepage & Huriot, 2002; Lisowski, 2002; Niemczyck, 1998). This is discussed further in section 3.4.

The (socio-) economic changes involved with the political transformation of 1989 included a change in mobility, resulting in a changing role of infrastructure. Moreover, the quality of the public transport system had degraded after decennia of poor maintenance, further stimulating car usage. Meanwhile, following the Western example, a desire for a single family house was rising among the inhabitants of Warsaw, which suffered from deteriorating living conditions (Crowley, 2003). Although the single family house is commonly known to be the favourite dwelling type, in reality, the multi-family apartment building dominated the post-communist residential developments (Grochowski, 2002). Nevertheless, the number of private residential developments increased in the Warsaw region, no longer structured by rail accessibility (Kiciński, 2005; Interviewee A, E, F & H). Since the road network was more dense than the rail network, the potential area for residential developments (retail and office developments as well) significantly increased. A location's popularity was by then greatly determined by its accessibility by car. From a peri-urban perspective, infrastructure was an important guider of developments during the course of the history of the region. From the moment the road network increasingly became a structuring factor of urban developments, the potential area increased as the road network was more densely covering the region. Conclusively, the mobility transition facilitated in the emergence and extension of the peri-urban area. An exception to the road oriented developments after 1990 was the construction of the southern part of the district of Ursynów, which was one of the most dynamic areas. The development of Ursynów was greatly stimulated by the construction of the subway, connecting the area with the city centre (see the second micro case in chapter five).

Warsaw's role in the region changed significantly during the analysed period. In the 19th century, Warsaw was the centre of work, living and culture, leaving an agricultural function for its surroundings. Functional relations with the peri-urban area increased with the industrialisation of the region, when suburbs provided Warsaw's industries with labour. During communism, industrial areas were predominantly located outside the city, whereby heavy industries became the dominating economic function of the peri-urban area, especially since agriculture had not intensified in the mean time. Slowly starting in the 1980s and accelerating the 1990s and 2000s, the functional relationship of the peri-urban area increased, as it became the location of residential, retail and service sector developments. This will be elaborated on in the following sections, starting with the influence of politics and spatial policy, which extensively influenced regional dynamics.

3.3. Politics and spatial policy

When discussing the context of Warsaw's peri-urban area, (inter)national political developments and, subjected to that, altering spatial policies, cannot be denied. As the case study analysis focuses on the post-war developments of Warsaw's peri-urban area, this is where the analysis of the political and spatial policy context starts.

A dramatic turn in the international politics, World War II, had an almost fatal consequence for the city of Warsaw (see the previous section). After the liberation, Poland came under Soviet control and Warsaw was chosen to become capital of Poland again, despite the almost complete destruction of the city (Dziewulski & Jankowski, 1957; Kaczorowski, 1965; Wandycz, 2001). It took until 1952 before the People's Republic of Poland was officially established. The Communist Party, under close supervision of its Russian counterpart, was put in charge. Foreign contacts were predominantly limited to the Soviet Bloc. Poland was largely disconnected from the Western World as a result. The new political situation opened up the large Eastern market again (Wandycz, 2001), which was a precondition for strong industrial growth of the following decades.

The communist ideology included striving for an egalitarian society. Strong governmental control of spatial and economic processes, such as a centrally planned (industrial) economy, was seen as essential to establish such a society (Grochowski, 2002). The centrally planned economy resulted in a large administrative system with an eminent number of jobs, all located in the capital city of Warsaw. This created a favourable economic position of Warsaw with regard to the rest of Poland. Moreover, Warsaw was re-established as one of the largest industrial areas in Poland. The effects of the economic conditions on peri-urban dynamics are analysed in section 3.4. In the following subsections the role of planning and its effects on peri-urban developments are dealt with.

With little autonomy for local authorities, spatial processes in the Warsaw region reflected national planning trends (Crowley, 2003; Grochowski, 2002; Lisowski, 2002; Niemczyk, 1998). However, national policy was influenced by planners in Warsaw, who were an influential source of planning thought during the interwar period. Several interwar spatial concepts, such as 'ventilation wedges' and development plans of the region, such as *Functional Warsaw*, survived the War and were partially implemented during the reconstruction phase. Also the remembrance to the excessive concentration of the city centre and excessive ground speculation in its surroundings were still present (Kaczorowski, 1965; Malisz, 1987).

In October 1945 the government nationalised all real estate and territory within the pre-war city boundaries, to increase the control on the city development. In 1951 the city's territory was tripled, matching the size of the Warsaw Metropolitan Community, a concept from *Functional Warsaw* (Chodakiewicz & Currell, 2003; Kaczorowski, 1965; Malisz, 1987; Markowski, 1997; Niemczyk, 1998). Relevant for this research is that with the enlargement of Warsaw's territory, a significant part of the peri-urban area came under the control of the Warsaw municipality. The new territory existed predominantly of extensive agricultural areas and forests, providing the city with plenty of expansion possibilities within its own territory.

The reconstruction of the city occurred with the pre-war living conditions in mind. Functional deconcentration was made possible with the enlarged municipal territory. To avoid land use conflicts and to improve living conditions, industrial functions were planned outside the city, in the new municipal territory (Malisz, 1987; Niemczyk, 1998). Furthermore, the infrastructural component of *Functional Warsaw* was largely used as an example for the reconstruction of the city, which strengthened the urban finger structure. The sectors ('green wedges') in between the infrastructural axes were kept free from urbanisation for purposes such as agriculture, forestry and protected natural amenities (Malisz, 1987).

Naturally, *Functional Warsaw* was not the only influence on the reconstruction plans of Warsaw. In 1949, during the Conference of Architects, the principles of 'socialist realism' were officially declared. This became the leading doctrine in the reconstruction and led to the banishing of deconcentration as a purpose. Instead, urban compactness, so as to economise the use of space, became the leading philosophy (Malisz, 1987). This can partly be recognised in the centralisation of public functions, as described in section 3.2. Compared to the concentration of the pre-war city, the density of the reconstructed city was rather low. This was partially the effect of wasteful land management as a result of the absence of a market economy and market conform land values (Lisowski, 2002; Niemczyk, 1998). Nevertheless, it did result in a market conform density pattern: high densities in the city centre, decreasing towards the city fringe (Bertaud & Bertaud, 2000).

Meanwhile, the reconstruction plans were criticised by the communists for the insignificant role of heavy industries. Subsequent reconstruction plans therefore included an extensive expansion of industrial locations in the peri-urban area, in the newly acquired municipal territory. With the localisation of industries large areas of open space were preserved to function as a buffer zone to protect inhabitants from the heavy pollution. In other words, physical planning became heavily influenced by economic policy, of which (ideologically driven) industrialisation was the prime target (Lisowski, 2002; Malisz, 1987; Niemczyk, 1998). The economic function of the peri-urban area became quickly dominated by heavy industries as a result.

The extensive governmental influence on spatial processes can also be illustrated with the 'deglomeration' policy, which started in 1955. The objective of this nationwide policy was the even dispersal of population and industrial complexes through the country. The policy was partly in line with the deconcentration concept of *Functional Warsaw*, although that was not focussed on industrialisation. The deglomeration policy included migration restrictions to, among other large cities, Warsaw. Although migration to the Warsaw region as a whole decreased, migration to the immediate surroundings of Warsaw increased. This was the result of a labour shortage which originated in the city, immediately after the migration restrictions were put into force (Kaczorowski, 1965). Furthermore, limited industrial growth of Warsaw, and the construction of new industrial branches 30 to 60 kilometres outside Warsaw were part of the deglomeration policy (Kaczorowski, 1965; Lisowski, 2002). Although the deglomeration policy had a significant impact, it also shows a collision between induced deconcentration and autonomous economic processes of concentration (Lisowski, 2002). Despite heavy subsidising, the new peripheral industrial branches had difficulties to survive. They are generally seen as an economic failure (Korcelli, 2005; Markowski, 1997). Economic developments in Warsaw's fringe were artificially kept at a low level, producing a gap between supply and demand.

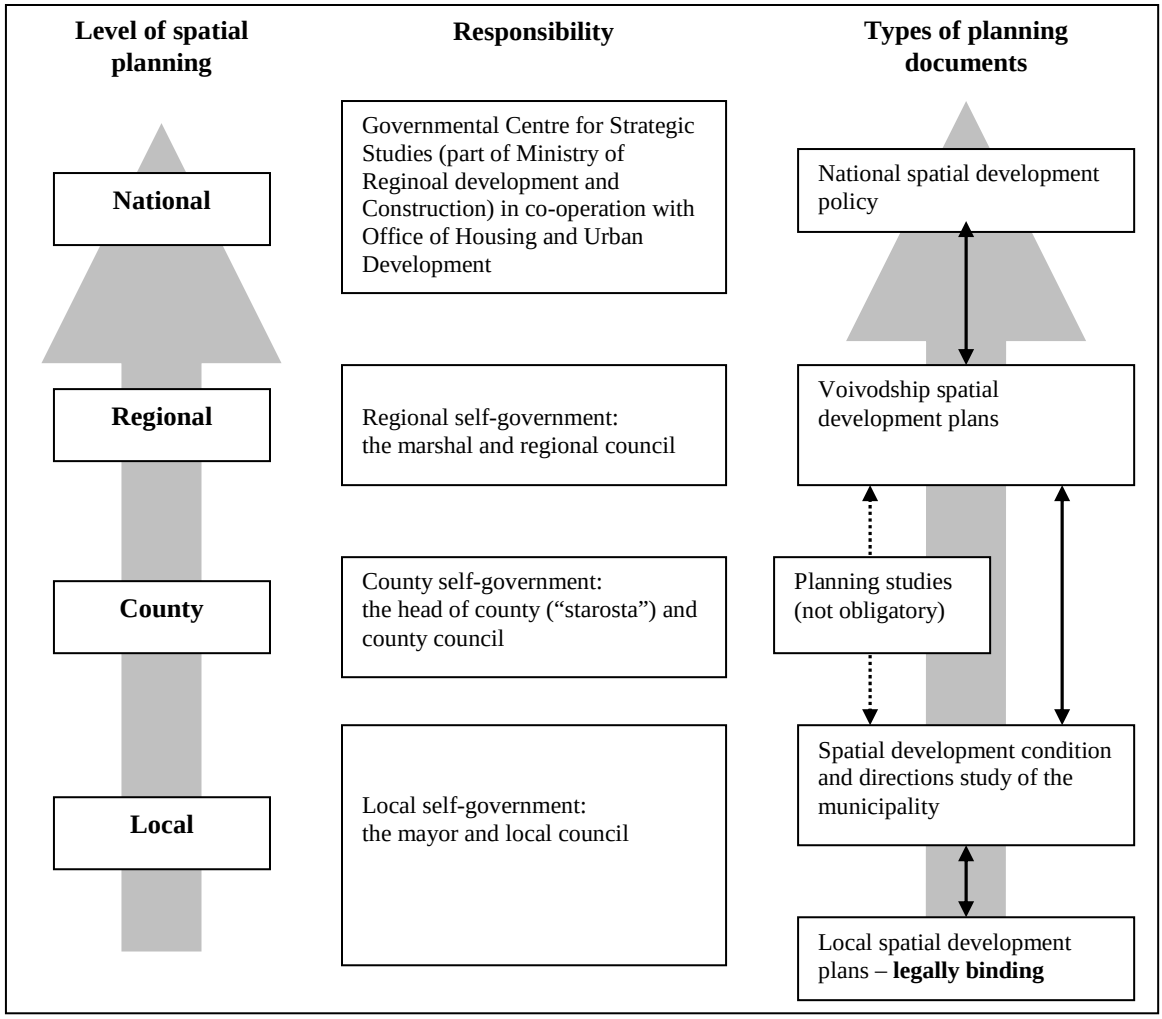
An influential study in 1971 recognised the positive aspects of concentration of population and economic activities in major cities. As a result, the deglomeration policy was abandoned and replaced by a national policy emphasising concentration (Korcelli, 2005). The municipality of Warsaw received large housing targets from national authorities, resulting in large monotonous residential areas in Wilanów and Ursynów for example (see the micro cases in chapter 6). Also investments in heavy industries, by then accounting for 40% of governmental investment outlays, were concentrated near Warsaw (Lisowski, 2002). The example of the deglomeration policy illustrates that national policy could directly influence the acts of local authorities. This had effects on the localisation of governmental investments in industries and housing units for example. Since the centrally planned economy hampered nearly all other peri-urban dynamics, shifts in policy were rather significant for the developments of the peri-urban area, as will be shown in chapter four and five. However, it also showed that there were limits to social engineering and economic planning.

The political revolution of 1989 had enormous consequences for the role of the government in Poland, which changed from a determining role to a rather modest role. From a spatial planning perspective, an important change was increase of local autonomy. The reform of spatial planning in Poland was institutionalised in 1994, with the Act on Physical Development (Bryx, 2008; Szulczewska, 2001). This Act (also called 'spatial planning act') included strong decentralisation of spatial policy (see Figure 3.1) which was in line with body of thought of that time. The governmental layers and the accompanying spatial planning competences are discussed in the following subsection, starting with the national level, moving down to that of the municipal districts. Although the spatial planning act was amended in 2003, its principles remained the same (Bryx, 2008).

The current governmental structure is comparable to that of the communist period, although the County layer is new. Totally different from the highly centralised administrative system however, is the decentralised character of the contemporary system (see Figure 3.1). The governmental layers, and their role in spatial planning, are introduced here from top to bottom. The national government is responsible for the creation of a national spatial development policy. Furthermore this layer is responsible for creating laws and regulations regarding to spatial planning which are binding for all public and private actors (Interviewee D). Poland exists of sixteen regions or voivodeships (województwo), with Warsaw situated in the Masovian region. Regions are in the position to create regional development visions, although it is expected that these visions are in line with the local plans of the municipalities (Interviewee A). Regions exist of two tiers of local authority: counties (poviats) and municipalities (gminas). A county exists of several municipalities. This layer has been introduced in 1998, but has little influence on spatial planning in Poland (Interviewee H). Municipalities have received a rather high level of autonomy with regard to spatial planning. They are responsible for meeting the collective needs of its citizens (Kulesza, 2001). They have the possibility to create local land use plans and to approve construction applications. Their income is generated by residential tax and professional tax, as well as state funds (Kulesza, 2001; Interviewee A). The spatial planning act provides Poland with a decentralised, bottom-up planning system, as Bryx (2008, p.12) explains: 'There are no decisions on the central governmental level that are passed to [the] local level to be implemented'. Furthermore Bryx indicates that the provincial and national spatial development

plans are 'built as a sum-up of approved local plans' (2008, p.12). Hence, the Polish spatial planning system works predominantly bottom-up.

Figure 3.1: Organisation of spatial planning in Poland



Although the municipality is the lowest governmental layer in the rest of Poland, Warsaw consists of several districts. This layer was introduced specifically for Warsaw in 1990. From the introduction to 2002 the eleven districts were almost as autonomous as municipalities. However, in 2002 the districts lost a part of their autonomy and the municipal coordination between districts has improved since (Kiciński, 2005; Kulesza, 2001; Interviewee H)[16]. The relevance for this study lies in the fact that the suburban districts have large quantities of developable space available. Increased coordinated municipal spatial management can therefore lead to more coherent spatial structures in the peri-urban area.

The decentralised (bottom-up) governmental structure hampers the creation of coherent regional spatial policy, since municipalities are competing rather than cooperating. Consequently, the peri-urban area's management is fragmented. Coordination of municipal actions from the national or regional layer is mostly impossible due to

[16] In 2002 the central district was split in seven central districts. An adjacent municipality was incorporated by Warsaw, adding an extra suburban district – from ten to eleven – to Warsaw's territory.

the high level of municipal autonomy. The effects of this situation on the peri-urban area are discussed in more detail in chapter four.

Hence, municipal policy is the most important governmental influence on spatial processes. Yet even municipal influence is limited. With the communist expropriations still in mind, private property has been made very hard to dispossess by the Polish post-communist law (Shifflet, 2001[17]). Furthermore, local authorities cope with both financial and human resource capacity problems. It is hard to find capable civil servants, for a salary significantly lower than in the private sector (Interviewee G). In combination with the reintroduction of the market economy, also secured in the Polish Constitution[18], spatial processes are mainly driven by market forces. This is amplified by the competitive policy pursued by municipalities.

Warsaw's first post-communist Master Plan (1992) is illustrative for the 'zeitgeist' shortly after the fall of communism. The plan aimed at unrestricted economic development by allowing nearly every kind of development anywhere (Interviewee C). Municipalities surrounding Warsaw practiced similar strategies, trying to attract as much investments as possible (Interviewee A). After all, new residential, retail, and office developments result in increased income. The consequence of the post-communist governmental situation is that spatial processes are hardly guided by governmental policy. Private investors dominate the developments in the region. This situation has revolutionary effects on developments in Warsaw's peri-urban area: the economically underdeveloped region, covered with extensive agricultural areas, suddenly became highly profitable investment areas. An acceleration of peri-urban developments, including residential, retail and service related industries occurred, which is elaborates on in the next chapter.

Conclusively, Warsaw's political context was rather unstable with radical effects on spatial policy applying in the region. Especially interesting are the changes related to the disappearance of communism in 1989. With that political revolution, spatial policy, which was nearly completely in the hands of the national government, became the responsibility of local authorities. At the same time private parties, which played an insignificant role during communism, became dominant. The radical change in the balance of power between public and private parties caused a fundamental change of course of peri-urban developments, which is analysed in the next chapter.

3.4. Economy

Warsaw's economic development is closely related to political events and influences. Economic forces were and still are important drivers of peri-urban developments, therefore the Polish and Warsaw's economic phases of development are analysed here.

Since the destructions of the Second World War had especially hit the city of Warsaw and industries near the city, the economic meaning of the peri-urban area was hardly more than that of extensive, since it was barely

[17] See also the *Constitution of the Republic of Poland* (1997, Chapter 2, article 46): 'property may be forfeited only in cases specified by statute, and only by virtue of a final judgement of a court'.
[18] See article 20 of the *Constitution of the Republic of Poland* (1997, Chapter 1).

mechanised, agriculture. However, since regional urban structures and (rail) infrastructure were relatively intact, regional conditions for quick reindustrialisation were present.

The major post-war economic change consisted of the introduction of the centrally planned economy, serving the ideologically driven strive for an egalitarian industrialised society (Grochowski, 2002). This included the nationalisation of the entire Polish economy, combined with enormous state investments in the heavy industrial sector. The Polish secondary and tertiary sectors were dominated by state-owned jobs (between 90% and 95% in the period 1950 – 1980). In contrast, the majority of the labour force in the primary sector operated outside the socialist system: mainly in the form of individual farmers, something unique in the Soviet Bloc (Chodakiewicz & Currell, 2003; Shifflet, 2001). This was the effect of an upheaval in 1956, when peasants spontaneously reclaimed their land, which halted the collectivisation and even caused restitution of farmland. Eventually the private agricultural sector was tolerated by the government, something unique in the Soviet Bloc (Chodakiewicz & Currell, 2003). As a result, most rural parts of Warsaw's peri-urban area were in private hands when communism disappeared. This enabled quick land conversion as is elaborated on in chapter four. As a result of the collectivisation of the Polish economy location choices were hardly affected by market forces, all the more by economic policy of the Communist Party. Illustrative is the deglomeration policy (introduced earlier), which led to the establishment of industrial branches outside the main industrial regions. A policy which turned out to be very inefficient (Kaczorowski, 1965l; Korcelli; 2005; Markowski, 1997).

During communism, Warsaw had an exceptional position in Poland. The city was blessed with several kinds of economies, derived from its status as capital. This included an impressive number of administrative jobs and economic activities connected to cultural, scientific and political activities in the capital (Crowley, 2003; Kaczorowski, 1965). Furthermore, Warsaw was rebuilt as one of the industrial centres of Poland, causing an impressive number of job-seekers to come to the Warsaw region (see section 3.5). Destroyed industrial areas were rapidly rebuilt and new areas were pointed out, using excessive amounts of land, enabled by the absence of market conform land value. Protecting Warsaw's inhabitants from the polluting heavy industries was a prominent reason for this wasteful land use, retaining space for future developments (such as urban parks which were never built) was another (Lisowski, 2002; Markowski, 1997; Niemczyk, 1998).

During the deglomeration policy it increasingly became clear that Warsaw offered a locational advantage. Many peripheral industries were less efficient than those in Warsaw (Kaczorowski, 1965; Korcelli, 2005). Despite this locational advantage, the absence of the private economy resulted in relatively low dynamics in Warsaw's peri-urban area. This changed somewhat in the 1970s and 1980s[19], though a real change-over came with the re-introduction of the market economy in 1990. Until then, the peri-urban area was characterised by extensive agriculture and large industrial complexes. Other economic activities generally took place in Warsaw's city centre, such as the vast number of administrative jobs and tolerated street markets (Crowley, 2003).

[19] In the early 1970s the deglomeration policy was halted and replaced by a policy aiming more at concentration. As a result several new industrial areas and especially residential areas were constructed in the suburban districts of Warsaw (Crowley, 2003; Lisowski, 2002).

Compared to the Western market economy, the entire centrally planned economic system of the Soviet Bloc was less productive (Brada, 1973). The economic crises, preceding the collapse of the Soviet Union, are illustrative. Low flexibility, due to ideological overemphasis on industrialisation and production (instead of consumption), and stimulating labour intensive industries, trying to hide unemployment, contributed to the inefficiency (Crafts, 1996; Crowley, 2003). Consequently, a socio-economic gap with Western countries increased. Furthermore a strong desire for consumption emerged due to the communist overemphasis on production (Crowley, 2003; Kreja, 2006). This strongly affected peri-urban dynamics after the disappearance of the centrally planned economy, as is explained below.

After the fall of communism, the Polish economic system was reformed to such a liberal regime that it had more resemblance with the United States, than the West European economies. The private market economy was reintroduced, accompanied with strong protection of private property and an extremely liberal trade regime (Murrell, 1993). The government decreased the level of economic interference. Privatisation of (inefficient) state-owned companies took place on large scale leading to the bankruptcy of many of them (Keane & Prasad, 2001; Murrell, 1993; Paci, Sasin & Verbeek, 2004). The term 'post-communism', often used to indicate the period, refers to the aversion against the communist regime and the corresponding economic system. It inexplicitly explains the great reversal of the economic system, which was institutionalised quickly after the disappearance of communism[20].

After a couple of years, the reform led to strong economic growth in entire Poland. The reintroduction of free trade with the Western world resulted in an explosion of foreign direct investments (FDI) (World Bank, 2008). A process of deindustrialisation, which started in Warsaw in the 1980s, accelerated and spread over the entire country (Lisowski, 2002). The significant increase of economic developments in Poland was especially tangible in the Warsaw region (Korcelli, 2005). The global post-industrial economy quickly developed in the inner city, existing predominantly of high-order service multi-nationals (Bourdeau-Lepage & Huriot, 2002; Keivani *et al*., 2002). Along Warsaw's access roads many foreign, large scale retail developments took place. Smaller retail businesses and offices followed shortly after (Crowley, 2003; Kreja, 2006; Lisowski, 2002). Thus, strong economic growth in the tertiary sector went alongside with large scale deindustrialisation. Furthermore the housing sector experienced a turnover. Before 1990, housing supply was almost completely in the hands of public housing corporations. With the retreating post-communist government the housing market came largely in the hands of private actors, mainly large investors (Crowley, 2003; Interviewee G). A housing shortage and a rising welfare offered enough opportunities to make a considerable amount of profit in the Warsaw region (REAS, 2007). Relatively low land prices and low profits in agriculture contributed to this (Wasilewski & Krukowski, 2002). The flourishing housing market especially concentrated in the suburban districts of Warsaw

[20] With a post-communist economy one generally aims at capitalism with a communist history. The term 'post' indicates that a part of the communist history has not been wiped out, but (unintentionally) taken into the capitalist society. In the Polish case the extremely liberal economic legislation can be seen as a reaction to its communist history. Meanwhile, many civil servants stayed in position after the disappearance of communism, having trouble adapting to the new situation. This puts a post-communist economies (or more generally, societies) for different challenges than capitalist ones.

and the surrounding municipalities, driven by residential preferences. This directly influenced peri-urban dynamics and is therefore elaborated on in the next chapter.

Currently, Warsaw is one of the European cities competing on a European and even global level. A low unemployment rate, an increase in metropolitan functions and businesses, and a high rate of employees in the tertiary economy cause the city to do well in the global competition (Bourdeau-Lepage & Huriot, 2002; Korcelli-Olejniczak, 2007). The recent entrance of Poland to the EU (2004) has caused another acceleration in the economic development of the city. This involved a further increase in FDI as well as an increase in the average price of housing units in Warsaw, which doubled between 2004 and 2008. This is a reflection of the economic prosperity of the city, but it also stimulates the process of suburbanisation, since land value is considerably lower in communities surrounding Warsaw (REAS, 2008). The region faces (economic) challenges as a result of the globalisation, such as the economic functioning of the metropolitan area. Such issues are discussed in the following chapter.

When reviewing the economic history of Warsaw and Poland, it can be concluded that almost the entire observed period Warsaw had a prominent national position. As a consequence, the region constantly attracted migrants from other parts of Poland, as is shown in the next section. This resulted in a constant urban pressure on the peri-urban area. Furthermore, transformations in the type of economy have taken place. As shown in the previous section, the agricultural function of the city surroundings gradually changed into an industrial function as from the second half of the 19th century. After a period of industrial decline and upturn in the service economy during the interbellum, the communist period was characterised by strong industrialisation. Economically, the peri-urban area functioned more and more as the industrial production area. Nevertheless, the peri-urban dynamics were relatively low due to the absence of a private market economy. After 1990, the reintroduction of the market economy in 1990 resulted in an explosion of peri-urban dynamics, as if catching up for a lost period. Heavy industries were largely replaced by the tertiary sector, causing another shift in economic significance of the peri-urban area. It clearly shows that (inter)national economic trends (in combination with the political situation) were very important for the progression of Warsaw's peri-urban area.

3.5. Demography

Warsaw's relatively prosperous economic situation attracted mainly job seekers, resulting in a constant growth of the city's population until the Second World War (see Figure 3.2). Since the late 19th century, also the surrounding region of Warsaw experienced a strong population growth (especially along rail infrastructure), during the interwar period even stronger than the city of Warsaw itself (Kaczorowski, 1965). Important for the post-war migration flows is the near total destruction of the city of Warsaw and, just as important, the survival of most peri-urban housing units. These were, as explained in section 3.2, in a rather deteriorated state. The following subsections elaborate on the demographics after the Second World War.

Warsaw's population significantly shrunk during the Second World War (see Figure 3.2). When Warsaw was quickly reconstructed as the national economic centre, its population grew alongside. Since 72% of its housing stock was demolished, a housing shortage in the city was the result (Crowley, 2003; Kaczorowski, 1965).

Consequently, a vast amount of modern apartment blocks were constructed, heavily subsidised by the government. Meanwhile, the suburbs were still a far from favourable place to live. The quality of the suburban housing had even further degraded due to overdue maintenance during the War. Moreover, rents in Warsaw were generally lower than in the suburban area, where houses were generally constructed without state credit. Consequently, the attractiveness of Warsaw was immense, especially when considering the higher probability of obtaining a job when living in Warsaw (Kaczorowski, 1965; Lisowski, 2002).

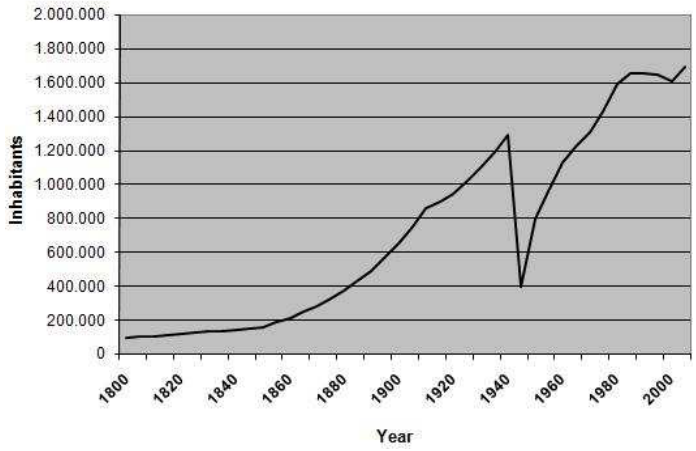


Figure 3.2: Number of inhabitants in the city of Warsaw (1800 – 2005)

Based on statistics by Crowley (2003), Dziewulski & Jankowiski (1957), GUS (2008), Kaczorowski (1965), and Wandycz (2001)

As from 1955, migration to the capital was restricted due to the deglomeration policy. Although this policy ended in the early 1970s, migration restrictions stayed in force until 1984 (Lisowski, 2002)[21]. As a result, migration to Warsaw halved, immediately causing a labour shortage. Attracted by the labour shortage and pushed by high unemployment rates in the rest of Poland, job seekers kept coming to the Warsaw region. Since it was now more difficult to settle in the city of Warsaw, migration to Warsaw's peri-urban area increased, stimulating further urbanisation in the region (Kaczorowski, 1965; Lisowski, 2002). Despite the increased migration to the peri-urban area, Warsaw was still seen as the most favourable place to settle by most.

Migration patterns of the Warsaw region were characterised by a net migration surplus. The trend between 1950 and 2000, however, is clearly a decline in this surplus. Also the natural increase of the region steadily decreased. The regional average annual increase of more than 3% in the 1950s dropped to virtually 0% in the 1990s. Moreover, the population of the city of Warsaw started to decline after 1988. The peri-urban area retained a migration surplus, driven by the process of suburbanisation (Lisowski, 2002). This can be considered as a remarkable turnover in migration patterns, given that during the period of migration restrictions, migration to Warsaw dominated. A significant number of migrants leaving Warsaw currently settles in the surrounding municipalities (Interviewee E). The process of suburbanisation is stimulated by significant socio-economic changes involved with the fall of communism (Kupiszewski, 2005). The Warsaw region, however, was a forerunner in Poland in this respect. Several of the socio-economic changes in the region, among other things

[21] Migration restrictions to Warsaw functioned as a Catch 22: to settle in Warsaw, one was obligated to have a job there. To obtain a job in Warsaw, one needed to be a resident of the city (Interviewee I).

deindustrialisation and a rise in car ownership, preceded the fall of communism (Grochowski, 2002; Lisowski, 2002). This is further analysed in the next chapter.

Currently, Warsaw is one of the few cities in Poland with a positive net migration. After a short period of shrinkage, the population increases with a modest annual average of 0.2% since 2002. The natural increase of the city is virtually zero (GUS, 2008). The current population growth is the result of large scale investments of the private sector in residential areas at the fringe of the city. Due to the enlargement of the city property in 1951, the municipality of Warsaw offers enough locations to extend the urban area. The population growth in the eleven suburban districts (almost 2% annually since 2000) compensates for the decline of the seven central districts (0.8% annually since 2000), which can be seen as a process of suburbanisation within the municipal boundaries. Also the municipalities surrounding Warsaw show a demographic growth as a result of the positive net migration (GUS, 2008). The current migration pattern leads to a modest change in the balance between the city and its surroundings. Moreover, the continuing migration to Warsaw's peri-urban area puts pressure on rural parts of the peri-urban area. The weak agricultural sector makes the rural areas vulnerable to rural-to-urban land conversion. This receives attention in the next chapter.

3.6. Conclusion

Having explored the context of Warsaw's peri-urban area since the 19th century, it is possible to state that the urban, political and economic context has fundamentally influenced peri-urban developments. Furthermore, most contextual changes have developed interrelated. Especially political and economic developments can be phased in similar time spans. Since Warsaw has continuously been a national economic centre, especially qualitative economic developments (the turnover from industrial to post-industrial economies) have been of influence to peri-urban changes. Changing migration patterns are also related closely to these qualitative economic developments. In general, the unity of contextual changes forms a rhythm through time and space, phasing developments occurring at the meso level. In the next chapter it is analysed how these macro trends have influenced processes in the peri-urban area in the post-war period. Chapter five explores the effect of an altering context on a local level, with two micro cases.

Chapter 4: Meso level: Warsaw's peri-urban area

Marc Beeftink

4.1. Introduction

In the previous chapter, it has become clear that radical contextual changes have influenced the changes in Warsaw's peri-urban area. In this chapter more direct influences relevant for the progression of the urban fringe are analysed. It is tried to unravel the complex interplay of processes on different scales and dimensions, resulting in peri-urban dynamics. To achieve this, the development of the peri-urban area has been divided in several periods of time. These phases are an obvious result of the contextual developments, discussed in the previous chapter. Furthermore, attention will be paid to the specific regional circumstances (meso) influencing changes of Warsaw's peri-urban area. Ultimately, this analysis leads to an improved understanding of non-linear peri-urban dynamics, evolving through time.

4.2. Reconstruction (1945-1954)

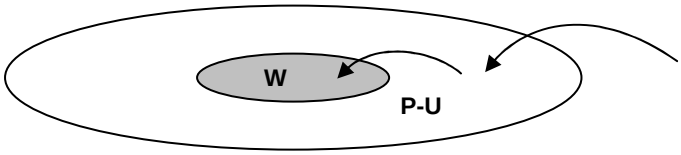
Before proceeding to the analysis of the peri-urban area during the reconstruction phase, the pre-war situation of the peri-urban area is shortly pictured. During the century preceding the War, the spatial structures of the region changed from a central city in a rural region to a star-shaped urban network. This can be considered a change in urban-urban relations (or the relocation of urban growth along the railways, see previous chapter), rather than a change in rural-urban relations. Yet, the urban fringe served a specific economic purpose, as industries could be found especially at the fringe of Warsaw, where rail infrastructure entered the city (Kaczorowski, 1965). Rural areas in between the urban fingers were still characterised by meadow land, forests and agriculture, which was of an exceptionally low intensity compared to West-European standards (Wandycz, 2001). Economically, rural areas functioned predominantly as agricultural production grounds, although in the closer vicinity of Warsaw and its suburbs rural areas were subjected to land speculation (Lisowski, 2002). Rural-urban interactions were confined to recreational use of forests surrounding Warsaw, which was first acknowledged by the authorities in the planning of green wedges in the 1930s, intentionally connecting the inner city parks with the peri-urban recreation zones (Kaliszuk, 2002).

After the Second World War all property within the pre-war city limits was communalised and the market economy was nationalised. The reconstruction phase started with an imploded urban structure; a destructed centre with the urban fingers left largely intact (see section 3.2). These macro events were rather determinant for peri-urban dynamics. It could be argued that the destruction of the city created an 'additional peri-urban area' which was quickly re-urbanised in the years after the War. Dynamics in the peri-urban area surrounding the city diminished by the absence of the private market economy, governmental investments were practically the only drivers of change. Easy land confiscation also contributed to a halt of land speculation (Crowley, 2003; Lisowski, 2002; Niemczyk, 1998). This is important to notice, as peri-urban dynamics are usually characterised by the struggle of different economic functions to obtain a location near the central city (Hepner, 1985). With the nationalised, planned economy, these dynamics disappeared, unintentionally safeguarding agricultural and other economically vulnerable functions (Lisowski, 2002).

Hence, peri-urban dynamics became largely dependent on governmental plans. The reconstruction plans provided for a mixture of, *inter alia*, administrative, cultural and scientific functions in the city centre, surrounded by residential areas. The peri-urban area was seen as the right place for heavy industrial complexes, in which was extensively invested during the reconstruction phase (Kaczorowski, 1965; Lisowski, 2002; Niemczyk, 1998). Peri-urban dynamics were thus largely confined to the (re)construction of heavy industrial complexes, since population growth concentrated predominantly in urban areas, as explained below.

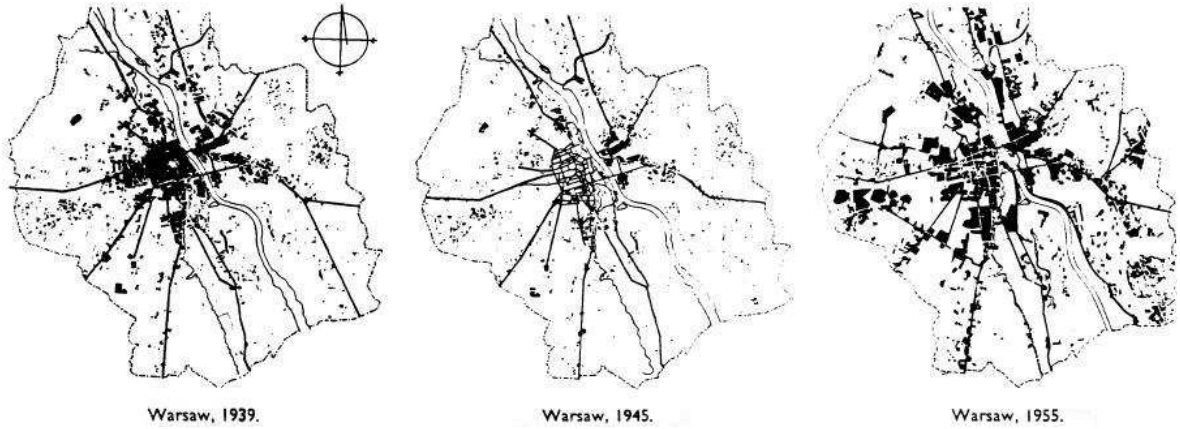
While the city of Warsaw experienced an enormous population growth, mainly consisting of migrants from its surroundings, the population growth in the peri-urban area was rather modest. Migration from outside the Warsaw region to Warsaw's suburbs slightly exceeded the migration flow from the suburbs to the central city (Kaczorowski, 1965; see Figure 4.1). Consequently, population growth, usually an effective driver for peri-urban dynamics, was not a major driver of change in the peri-urban area. Moreover, governmental investments in social housing concentrated in Warsaw and to a lesser degree in the suburbs. Nevertheless, the fear of excessive densities of pre-war Warsaw resulted in reconstruction plans which were less dense, inevitably leading to urban extensions. The territory of Warsaw was tripled in size in 1951, enabling the authorities to locate urban developments outside the pre-war city limits, along railway infrastructure. In 1955 the number of inhabitants was roughly three quarters of that of the 1939 population, while the built-up area stretched out further than that of the pre-war city (Figure 4.2).

Figure 4.1: The main migration flows of the Warsaw rural urban region in the first post-war decade.



Legend: **W**: municipality of Warsaw; **P-U**: peri-urban area of Warsaw; ⟶ main direction of migration flow

Figure 4.2: The municipality of Warsaw with built-up areas and main infrastructure indicated for the years 1939, 1945 and 1955



Source: Dzielwulski & Jankowski, 1957, pp. 214-5

Although most peri-urban dynamics were induced and regulated by the central government (via local authorities), the self-construction of single-family houses was not prohibited outside the pre-war Warsaw municipal area. Although exact figures are unclear, this share of housing construction was rather insignificant until the 1970s (Ruoppila, 2004). Residential developments were supplied by the government and generally in line with housing preferences of that time: relatively luxurious apartment blocks. Peri-urban single-family

houses were associated with low quality pre-war housing. Moreover, the construction of apartments was heavily subsidised, making it unprofitable to construct your own dwelling (Kaczorowski, 1965; Lisowsi, 2002). Hence, the urban finger structure was strengthened. The areas in between the urban fingers were, in line with pre-war planning thought, seen as green ventilation wedges, providing the city with fresh air, as well as linking up the recreational areas in the centre to the suburbs (Szulczewska & Kaliszuk, 2008). In practice, most rural areal functioned as agricultural production ground (see also the second micro case study, section 5.3).

The functional relation between Warsaw and its surroundings by the end of the reconstruction period resembled the pre-war situation, with the functional region extending up to 25 kilometres from the central city. The suburbs housed workers of Warsaw's industries. Industrial complexes were located near Warsaw, although most were situated a bit more distant from the city than before the War. Rural areas in between the urban fingers, released from the urban pressure, functioned predominantly as agricultural production areas. An important difference with the pre-war situation was the economic dominance of large heavy industrial state-owned companies in the region. A mono-economy had come into existence.

Pull:	**Push:**
Centrally planned industrial economy	Population growth
Social housing supply	

4.3. Deglomeration policy: pushing the limits of social engineering (1955-1970)

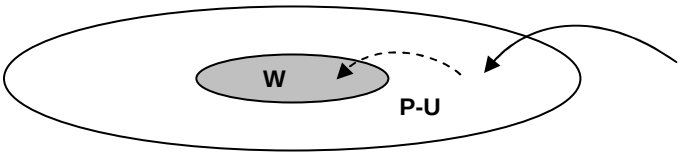
By 1955 the reconstruction was largely completed, except for some central districts in Warsaw where the pre-war situation was replicated, which took until the 1970s (Crowley, 2003). The two-and-a-half decades following the reconstruction phase are well marked by the deglomeration policy, which included migration restrictions to the city of Warsaw and decentralisation of the industrial capital. The deglomeration policy had to contribute to an equal spread of population and industries throughout the country. Positive effects were especially expected in less developed areas – particularly north, east and south of Warsaw (Kaczorowski, 1965). Since other conditions of peri-urban developments remained generally the same (most importantly the nationalised economy) private developments hardly influenced peri-urban developments.

The effect of the deglomeration policy on the municipality of Warsaw was a decrease of peri-urban developments. Residential developments became largely limited to intensifying the use of the existing urban fabric, where enough space was available. These developments were necessary to decrease the housing shortage, which nevertheless persisted, partly caused by natural population growth and the remainder of the net migration to the capital (which halved immediately after the migration restrictions were put into action). Since public housing investments in Warsaw were higher per housing unit than in its surroundings it kept attracting migrants, despite the migration restrictions. Also the labour shortage and the positive image of living in the city contributed to persisting migration to the city. Complementary to the migration restrictions was the reduced growth of industrial developments in the Warsaw municipality (Crowley, 2003; Kaczorowski, 1965; Lisowski, 2002). Consequently, peri-urban dynamics were reduced to almost zero. The absence of a private economy (except a partly private agricultural sector) contributed to this.

The migration and industrial growth restrictions in Warsaw were flanked with investments in housing and industrial developments in small and middle-sized towns 30 to 60 kilometres outside Warsaw. Such towns, suddenly facing induced population growth, became largely dependent on a single state-owned industrial enterprise, although some towns functioned as agricultural service centre (Kaczorowski, 1965; Korcelli, 2005; Lisowski, 2002; Markowski, 1997). Early awareness of the highly inefficiency of the induced decentralisation, led to the abandonment of the deglomeration policy in the beginning of the 1970s (Korcelli, 2005). The limits of social engineering had been reached.

Next to the peripheral towns, suburbs closer to Warsaw faced an increase of net migration, as an increasing number of people was unable to settle in Warsaw where a labour shortage had come into existence (Lisowski, 2002, see Figure 4.3). Although the self-construction of single-family housing in the peri-urban area increased somewhat during this period, it was still rather insignificant (Crowley, 2003; Ruoppila, 2004). Most people settled in the existing suburbs, where they were ensured of rather convenient transportation connections with Warsaw.

Figure 4.3: The main migration flows of the Warsaw rural-urban region as a result of the 'deglomeration' policy (1955-1970).



Legend: **W**: municipality of Warsaw; **P-U**: peri-urban area of Warsaw; ⟶ main direction of migration flow; - - -▸ limited direction of migration flow

Although a decline in the number of commuters was expected as a result of the deglomeration policy, an increase of commuters was the reality. Since Warsaw never lost its industrial dominance in the region, forced job commuting of low skilled employees increased significantly, from 140,000 in 1963 to 200,000 in the 1980s (Kaczorowski, 1965; Lisowski, 2002). A shortage of industrial workers in Warsaw was rather pressing, therefore workers were encouraged to use heavily subsidised public transport facilities, as private car ownership was not very common (Kupiszewski, 2005; Lisowski, 2002). The functional region of Warsaw increased, without fundamentally changing the relation between Warsaw and its surroundings.

The deglomeration policy had predominantly quantitative effects, i.e. the location of industrial and population growth was influenced. In terms of rural-urban relations and spatial-economic innovation, similar developments as in the reconstruction phase can be observed: a dominance of supply driven, heavy industrial developments. The developments in the reconstruction phase were in line with, and supplying, an existing demand. The deglomeration policy related developments, however, were generally not. Rural areas remained predominantly functioning as agricultural production grounds. Several effects of the deglomeration policy however, such as migration patterns and increased commuting, were unintended and opposite to the expected. The communist government was facing the limits of social engineering. Nevertheless, the economic dominance of heavy industries was further consolidated, despite the failure of peripheral industrial branches.

Pull:	Push:
Centrally planned industrial economy	Autonomous migration patterns
Social housing supply	Economic failure of peripheral industrial branches
Deglomeration policy	

4.4. Increasing desire for change (1971-1989)

Governmental investments in heavy industries concentrated around Warsaw again, after the deglomeration policy was abandoned. It was becoming clear that the centrally planned economy was less efficient than the capitalist economies in many ways, see also section 3.4. An increasing proportion (40% in the 1980s) of the governmental investment outlays was pumped into the industrial sector in order to keep the economy running (Lisowski, 2002), further stimulating the existence of a mono-economy. Nevertheless, a process of spontaneous de-industrialisation emerged in Warsaw in the 1970s, and became significant in the 1980s (Bourdeau-Lepage & Hurtiot, 2002; Wrobel, 1992). As from the 1970s, similar to the industrial policy, governmental housing investments were concentrated in large cities, Warsaw among other cities. However, in contrast with the previous decades, the construction of large residential estates in Warsaw was mainly oriented at the fringe of the city. Since the public sector still accounted for roughly 95% of all housing constructions, such shifts in policy were rather meaningful (Crowley, 2003; Lisowski, 2002). At first sight, the effect of governmental supply-driven actions remained identical to the earlier decades of communism, only locational factors had changed. However, new, frame-breaking, relatively autonomous drivers of peri-urban change emerged in the 1970s, increasing in size in the 1980s. These are elaborated on below.

At first sight it seems that, apart from the locational shift, nothing changed in the governmental housing supply in the 1970s. While during the deglomeration policy, housing constructions in Warsaw were predominantly located in existing urban structures, in the 1970s and 1980s they were predominantly located at the city fringe, expanding the city concentrically into the territories which were acquired in 1951 (Lisowski, 2002). However, the governmental housing supply became affected by the financial problems, caused by the ailing industrial economy demanding an increasing proportion of the state budget. What became tangible was the declining quality of the newly constructed housing estates. With high housing targets and a decreasing budget, local authorities increasingly had to cut corners. By the late 1970s, housing units were delivered unfinished and the provision of social services, such as schools and shops, was postponed to later date (Crowley, 2003). The supply driven residential developments at the fringe of Warsaw increasingly suffered from a lack of quality, which is also illustrated in the first micro case (see section 5.2). This contributed to a declining quality of life in the city, affecting migration patterns.

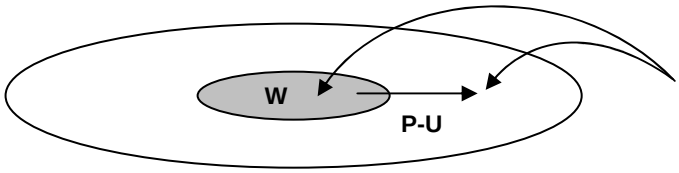
Apart from deteriorating quality of residential supply, the desire to distinguish oneself from the uniformity which was stimulated and created by the communist government, contributed to altering migration patterns. Practically absent due to the absence of a private economy, in the 1970s the private construction of manor houses by the wealthy inhabitants of Warsaw became significant (Crowley, 2003). They can be seen as forerunners of peri-urban change. The well-off inhabitants were pushed away from the deteriorating city, *inter alia* caused by hazardous environmental conditions, a result of the heavy industries (Angel *et al*., 2000). The increased car

mobility, which also contributed to worsening environmental conditions in Warsaw, enabled them to settle outside existing urban areas, without losing connection to the city. Although the volume of this development was rather modest, it was illustrative for the desires of the majority of the population (Dutt *et al*., 1991). From an economic perspective, the governmental ideological emphasis on production led to a strong desire for consumption, e.g. shopping, private car ownership, and the single house with a garden (Crowley, 2003; Dutt *et al*., 1991; Kreja, 2006).

In 1976, the national government acknowledged the desire for living in a single-family house by stimulating the construction of such dwellings by law (Crowley, 2003). However, this was an ad hoc policy, not embedded in corresponding institutional changes. Nevertheless, according to official figures, private construction of single-family houses increased from 5% of the total housing production in the 1970s to 10% in the late 1970s. This was probably even a low estimate since not all new constructions were recorded in official statistics (Crowley, 2003). Thus in the 1970s, private housing construction surfaced as driver of peri-urban change. Rural areas in and near the Warsaw municipality, until then relatively untouched by urban influences which were confined to governmentally induced urban extensions, became mixed with scattered developments of private single family homes. Although the mixture of functions did not directly result in functional changes of the rural areas, which remained predominantly agricultural, it can be seen as the take-off of the emergence of new spatial structures.

Driven by the above mentioned changes, new migration patterns emerged (see Figure 4.4). The population number of Warsaw's city centre started to decline and a growing number of people settled outside Warsaw. Despite the inner-city decline, during the 1970s Warsaw's population grew faster than the surrounding municipalities. Residents who settled in the new dwelling units in the urban fringe compensated for the inner-city decline (Lisowski, 2002). However, in the 1980s, the average number of yearly constructed housing units in the Warsaw municipality was only half the number of the 1970s, due to the increasing financial trouble of the local authorities. Consequently, the annual population growth of the Warsaw municipality in the 1980s was reduced to one third of that of the 1970s. Also the annual population growth in Warsaw's surroundings was lower than that of the 1970s; nevertheless it slightly exceeded the growth of the city of Warsaw in the 1980s. Note that the population growth of the metropolitan area decreased from 1.6% annually in the 1970s to 0.6% in the 1980s. This declining net migration to the region was caused by the poor economic circumstances of the Warsaw region and Poland as a whole (Kupiszewski, 2005, Lisowski, 2002).

Figure 4.4: The main migration flows of the Warsaw rural urban region since the 1970s and 1980s.



Legend: **W**: city of Warsaw; **P-U**: Peri-urban area of Warsaw; ⟶ main direction of migration flow

Conclusively, governmental supply oriented investments in industries and residential areas did not enforce fundamental changes in the rural-urban relationships in the Warsaw region. Rather these ideologically driven actions contributed to regional over-connectedness (or lock-in): a mono-economy of heavy industries and monotonous residential units. The occurrence and characteristics of a regional, industrial lock-in have been

described and explained by, among others, Allison & Hobbs (2004), Boschma & Lambooy (1999) and Grabher (1993). Since global (socio-) economic trends seemed to be running ahead of the ideological biased investments of the communist regime, this resulted in a decline of the economy. Furthermore, polluting industries and deteriorating housing construction contributed to a decline in the spatial quality of the Warsaw region. Such conditions are generally appropriate for novelty and innovation to occur (Allison & Hobbs, 2004), however institutional conditions, such as the centrally planned economy, precluded this from happening. In short, governmental actions *pulled* the region towards a declining industrial lock-in, resulting in a strong desire for change. This shows resemblance with the concept of 'disintegration', which was introduced in Figure 2.7.

Nevertheless, push factors, away from the declining industrial level, emerged. Material changes, such as autonomous de-industrialisation in and near Warsaw, increasing car ownership, and private single-family home construction, displayed an underlying driver of change: a desire for consumption. However, structural, interrelated and self-reinforcing changes were not yet taking place, as these developments were not flanked with institutional and organisational changes, of which the absence of a private market economy was the most prominent one. Since the push factors were working in the opposite direction from the pull factors, a potential for change rose. However, as Rotmans argues: 'the only way to clear [...] a lock-in situation and turn it into a transition is by applying force from outside the system' (2005, p.24). Therefore, we can conclude that, as long as the communist regime with centrally planned economy dominated peri-urban developments, it was unlikely that the peri-urban area would fundamentally change.

Pull:	**Push:**
Centrally planned industrial economy	Spontaneous deindustrialisation
Social housing supply	Private single-family house construction
	Desire for change

4.5. Tipping point (1989)

In chapter two, a tipping point is indicated as the demarcation between the take-off and the acceleration phase of a transition (Figure 2.4). For Warsaw's peri-urban area the collapse of the Soviet Union, and related to that the fall of communism in Poland, can be seen as a tipping point at the macro level. This macro level political event included the breakdown (creative destruction[22]) of institutional and organisational dimensions, which were replaced by new ones (reorganisation[23]). These radical changes accelerated relatively small-scaled peri-urban changes of the pre-1990s and made them apparent to the mass. The most influential changes included the reintroduction of the market economy (see section 3.4), extensive governmental decentralisation (see section 3.3), and the opening up of the borders with the Western world (see section 3.4) (among others Parysek, 2004; Wrobel, 1992).

For the peri-urban area, the fall of communism involved a disappearance of the strong pull factors, exerted by the communist government, opposing the more autonomous push factors. Instead, the new regime and the new institutional framework were in line with the people's desires, encouraging consumption. Consequently, the peri-

[22] See Gunderson & Holling (2002), cited in section 2.5
[23] Ibid.

urban area came under the influence of new factors, such as the market economy. Since autonomous drivers were now amplified with an institutional framework, an acceleration in peri-urban dynamics followed. Hence, it was indeed a force from outside the region, which 'unlocked' the region. The tipping point included not so much quantitative change, rather qualitative change, placing the peri-urban area in an entirely different perspective. For instance, extensive agricultural areas near the morphological fringe of the city, which were unintentionally protected from urbanisation due to the absence of a private economy, suddenly became potential investment areas. New spatial patterns, which slowly surfaced in the 1980s, became quickly apparent in the 1990s and 2000s. Dynamics in rural-urban interaction and spatial-economic innovation increased, as is further analysed in the following section.

4.6. Global service economy (1990-now)

The decades after the fall of communism are characterised by an acceleration of peri-urban dynamics, triggered by changes in multiple dimensions and on different aggregation levels. More precisely, the institutional and organisational transformation of 1989 enables economic drivers to exert influence on the peri-urban area, without being obstructed by the centrally planned economy. One of the prominent drivers of peri-urban change is the excessive demand for 'urban consumption', to which the reintroduced market economy quickly responds, for instance in the form of retail developments (Kreja, 2006). It results in significant, structural and irreversible changes – a transition – of the peri-urban area. Governmental actions can be seen as a pull the same direction as the relatively autonomous drivers of change. These drivers of change, identified as push factors in the pre-1990 era, are now regarded as pull factors, since they are conform with the post-communist 'economic paradigm'. Below, issues such as the new role of public actors, the influence of retail, residential, and service economy developments, and infrastructure receive further attention. The role of public actors is analysed first.

Changing role of the government

Governmental influence in peri-urban dynamics is extensively influenced by the decentralisation of economic and spatial policy to the municipal level. Since a great deal of municipal income is generated by residential and professional tax revenue (Kulesza, 2001; Interviewee A), municipalities are competing for such functions since the early 1990s. The stimulation of private economic developments can be seen as the result of the post-communist 'zeitgeist': a reaction to the excessive nationally planned economy and restrictions regarding the private economy during communism. Physical planning after 1990 is there to support economic developments, not to restrict them (Inteviewee C). The governmental drivers of change hereby work in the same direction as the more autonomous, economic drivers, instead of opposing them, which happened during communism.

Since the two formerly opposing forces are now enhancing each other, this allows for an acceleration of developments. However, since local governments are not only stimulating but also competing for economic developments, regional cohesion between municipal actions is rather low. Especially regional infrastructural facilities are not evolving with emerging trends, such as an increasing number of commuters by car, travelling from larger distances (Lisowski, 2002; Niemczyk, 1998). This receives further attention later this section.

Without the extensive governmental interference in land allocation, land use functions start to represent an interplay of supply and demand forces. An exception is the slightly overrepresentation of especially large retail

Textbox 4.1: The contra-productive Act on public-private partnership (PPP)

For the post-communist government, cooperation with private parties was a novelty, as this simply did not exist during communism. Resulting from a lack of experience of public actors, private parties were much sharper in negotiations and legal contracts, leaving public parties with unfavourable results. Furthermore, a commonly felt fear for corruption hampered public-private interactions. Consequently, in the early 1990s, hardly any PPP came into existence.

When public parties were increasingly getting used to dealing with private parties, it seemed that PPPs were going to be implemented. However, when Poland joined the EU in 2004, financial incentives to cooperate – PPPs are generally needed due to a financial deficiency – decreased because of numerous EU subsidies. A little later, in 2005, the Polish government designed a PPP-act to further stimulate PPP. Paradoxically, the new law made PP virtually impossible. In an effort to protect public parties, very strict rules were formulated which reduced the needed flexibility of PPP plans, scaring away private parties as a result.

Currently a less strict PPP-act is in force since February 2009, which is expected to lead to a breakthrough in, *inter alia*, infrastructural investments.

Based on: Interviewee D; Gołębiewska, 2007; Napiórkowska, 2008; Schnell & Haak, 2009

structures, such as hypermarkets, just outside Warsaw's municipal property (Czerny *et al*., 2002; Interviewee A; G). As explained by a real estate developer in Warsaw (Interviewee G), the surrounding municipalities are more attractive for investors to develop, not only for lower land prices, also for quicker and easier regulations and communication by the local authorities, trying to attracts investments. This touches upon a commonly noticed phenomenon in the Warsaw municipality**:** a shortcoming of governmental capacity. Several causes can be distinguished. First, although this applies for all local governments in Poland, the radical changes in public and private relations lead to an uncomfortable situation for many civil servants who stayed in function. Cooperation with private parties was unknown and until today public private partnerships are hardy taking place (see Textbox 4.1). Furthermore, the number and, due to low wages, the commitment of civil servants causes a lack of quality of Warsaw's city management (Interviewee G). Second, more specifically a Warsaw problem, the post-communist structure of the local government included rather autonomous districts (as explained in section 3.3), which caused managerial problems (Grochowski, 2002). However, Warsaw's districts lost a part of their autonomy to the municipal level in 2002; the situation has improved since (Interviewee H). Furthermore, there is a shortcoming on feedback between different sectors and levels of Warsaw's local government. For example, 'often it happens that the administration of districts allows unforeseen small development by investors and that the infrastructure department of the city is not informed' (Interviewee H). Third, several interviewees (Interviewee C, D, G & H) indicate that the municipality of Warsaw is dealing with more important issues than spatial planning, such as crime, road maintenance, schools, hospitals, water, sewage, electricity etc. These problems are partially caused by the fact that the city offers (and pays for) amenities for inhabitants of surrounding municipalities with no tax revenue in return. Fourth, and perhaps most importantly, the municipality of Warsaw lacks local land use plans in about 80% of the municipality's territory. For investors this involves months or even years of extra time before a development is officially approved, and thus costs extra money. Hence, developments are hindered and some investors prefer to locate developments outside Warsaw (Bertaud & Bertaud, 2000; Interviewee B, F, G & H).

For the public control of peri-urban development, the absence of local land use plans is rather devastating. Private investors can hardly be stopped from developing nearly everything they want. Consequently, not only the cohesion between developments in different municipalities is missing, also the cohesion and coordination of developments within the territory of Warsaw could use some improvements. The litigious attitude of the Poles is

indicated as a reason for the districts not being eager to create a local land use plan for their territory. The districts –in charge of creating local land use plans – are not prepared to deal with a lot of landowners who will possibly challenge the content of a new local land use plan. Rather they deal with individual cases (Bertaud & Bertaud, 2000). Furthermore, the municipality of Warsaw lacks a long-term strategy which increases uncertainty of future developments (Bertaud & Bertaud, 2000; Interviewee B). As a result, the capacity to guide or influence the mainly private developments is relatively small and seems confined to the provision of amenities, following private developments. Consequently, the governmental influence on the peri-urban area is rather modest. Therefore it is interesting to analyse economic drivers of peri-urban changes.

Economic transformation as a driver of change

With the reintroduction of the market economy (section 3.4), location choices are predominantly determined by accessibility, prestige and related to those; land value. Years of communism had left Warsaw's predominantly agricultural peri-urban area virtually unchanged, apart from several new industrial complexes and some scattered residential developments. Economic activities, such as public administration, trade and services, could be found in urban areas. Since the Warsaw region was still characterised by an urban finger structure separated by green wedges, agricultural functions could be found relatively close to the city centre. In 1993, only 44% of the municipality was built-up area, leaving more than half of the territory untilled. Non-urban land in the region functioned mainly as agricultural areas, although several areas have been assigned as national parks during the late 1950s. Examples are the Kampinoska forest north-west of Warsaw and Kabacky forest, situated in the south of Warsaw (the latter will receive attention in the second micro case, section 5.3), ensuring protection from urbanisation until today. Especially the agricultural areas, which are relatively small in size and in private hands, with relative low economic profits, are vulnerable to land use change (Bánski, 2006; Bertaud & Bertaud, 2000; Szulczewska & Kaliszuk, 2008).

With the private sector dominating land use changes after 1990, new peri-urban land use structures emerge, reflecting demand and supply mechanisms (see the previous subsection for exceptions). After an emphasis on industrial production for decades, an excess demand for consumption existed in the region, while the supply of functions such as retail, consumer goods and high quality suburban housing was virtually absent (Kreja, 2006). As a result of the excess demand, which even increased after 1990 driven by socio-economic changes, new functions rapidly develop, guided by the afore-mentioned locational factors prestige and accessibility. Apart from spectacular developments of skyscrapers in Warsaw's CBD, in the peri-urban area all kinds of developments representing the new economic reality occur, mainly oriented at access roads. Office locations, retail developments, and rather dense residential developments, built by private developers, are oriented at the radial roads, while the development of single family houses generally occurs in more distant areas (Kreja, 2006; Interviewee A; B; C; F). Since farmers, developers, residents, and local authorities all gain from rural-to-urban land conversion, this process takes place on a large scale. For instance, farmers in Piaseczno, a popular municipality bordering the south of Warsaw, receive up to 300 times their annual income per hectare, which can be considered as an enormous driver. Consequently, between 1993 and 2000, the total acreage of agricultural land was reduced by almost 10%; 6% of the municipality's total acreage (Wasilewski & Krukowski, 2002). These developments receive further attention in the following subsections.

Starting with the economic basis of the peri-urban area, the heavy industrial sector, it can be concluded that the process of deindustrialisation, which took off in the 1970s accelerated, in the 1990s. Persevered industries were privatised in the first half of the 1990s leading to the bankruptcy of many of them, since they were economically unprofitable. Especially for smaller cities, largely dependent of such companies, this had an enormous impact. It even caused a stream of formerly industrial workers seeking a temporary job in the agricultural sector, which had been predominantly private during communism (Markowski, 1997). However, in 1992 the economy started to grow, after years of economic decline.

In contrast with the more peripheral areas, Warsaw's city centre instantly became the prominent place of the private service sector, especially of business consulting (Lisowski & Wilk, 2002) and related metropolitan functions (Bourdeau-Lepage & Huriot, 2002). However, driven by high rents and the increasing car use, a decentralisation of service related business takes place. Unlike the retail sector, decentralised office locations emerge near the CBD, especially westwards, inside the existing urban fabric. Nevertheless, also new office locations are developed in the peri-urban area, along Warsaw's access roads. This concerns less prestigious businesses. Although the decentralisation of the service sector is significant, it is largely confined to the municipal limits (Lisowski & Wilk, 2002).

Under these conditions, halfway the 1990s a ring of hypermarkets emerged in the peri-urban area, just outside Warsaw's municipal border, oriented at the city's access roads. The quality of the developments was not particularly high, however this was not seen an obstacle to develop such centres since the supply of such retail was rare back then (Kreja, 2006; Interviewee A, B). Moreover, even if local authorities wished to prevent such low-quality retail developments from happening, the legislative framework would not be of assistance. More recently, new regulations demand extra permits for retail developments over 400 square meters of floor space. Furthermore, developers can be obliged to contribute to infrastructural investments which are needed for a certain retail centre (Interviewee B, G). From a theoretical perspective, the institutional framework is slowly co-evolving, adapting to market circumstances, and enhancing the grip of local authorities on peri-urban developments, stimulating a higher quality.

The quality of retail developments seems to increase rather autonomously as well. New (higher) market segments are tapped, such as retail centres including a fitness centre or a movie theatre – urban forms of the leisure economy (Kreja, 2006). Apart from the hypermarkets, the access roads of Warsaw are increasingly flanked with smaller retail and service businesses, developed in the second half of the 1990s and 2000s. This has changed the peri-urban landscape both in structural, functional and economic sense. Urban dwellers, predominantly travelling by car, are increasingly linked with the peri-urban area, as it has become the place to shop and to spend leisure time. More recently, retail functions are further suburbanising, following demographic decentralisation (Bourdeau-Lepage & Huriot, 2002), which is elaborated on later.

Hence, the economic function of the peri-urban area, especially near Warsaw's access roads, experiences significant changes. Nearby Warsaw, a mixture of offices, retail and other kinds of services are established. Further away from Warsaw the proportion of offices is lower. Just outside the Warsaw municipal border,

hypermarkets from the mid 1990s can be found. As a result, although Warsaw has maintained its dominant economic position in the region, the role of the peri-urban area in regional economics has significantly increased. Conclusively, structural and functional relationships in the peri-urban area have fundamentally changed, driven by economic pull factors. This has resulted in new patterns of land use and intensified its functional relation with the city of Warsaw. The next section contemplates another new function of the peri-urban area, namely that of a desired place of residence.

Residential developments

Radical socio-economic changes are involved with the economic transformation, such as an increase in wages in all sectors, which leads to significantly higher wages in Warsaw than in the rest of Poland. One of the effects is the attraction of new residents to the region. Another effect is increasing migration of Warsaw's inhabitants to the peri-urban area (REAS, 2008; Interviewee E). Despite the common preference for the single family house, this is still a trend reserved for the better-off (Czerny *et al*., 2002; Grochowski, 2002; Lisowski, 2002). Grochowski explains: 'consumption preference of the "new middle class" is frequently rather a car [...] than a house with a garden (2002, p.37). Hence, larger movements have been observed from the city centre towards multi-family houses at Warsaw's fringe and near existing suburbs. Residential developments after 1990 can be distinguished from the communist developments in size and quality, a result of both a demand for quality and rather strict construction laws (Lisowski, 2002; Grochowski, 2002; REAS, 2008; Interviewee E; F). As an effect, especially the better-off are leaving the city centre, where the pre-1990 housing estates dominate the residential offer (Interviewee F).

The private development of residential areas is not confined to the municipality of Warsaw. On the contrary, surrounding municipalities successfully attract residential developers. As a result, since 1990, the inflow of especially better-off residents coming from Warsaw has caused a rise in the average salary and consequently the tax revenue of such villages. Piaseczno, a popular municipality south of Warsaw for instance, faced a six fold increase in local tax revenue between 1994 and 2000. Farmland in this municipality has been reduced by almost 10% in the same period, driven by the fact that farmers can receive 300 times their annual income for a parcel used for residential developments (Wasilewski & Krukowski, 2002).

Such peri-urban and suburban residential developments have to be considered in relation with the flourishing service sector in the city of Warsaw, involving generous salaries compared to the rest of Poland and the agricultural sector. This enables developers of residential schemes – but also of retail and office locations – to make more expenses, since their customers are able to afford higher prices. The development of multifamily housing units occurs mainly at the urban fringe, where inhabitants enjoy the prosperity of both the city and the open surroundings. However, the single family houses often occur in a more dispersed manner, causing a mix of rural (agriculture) and urban (residential) functions. Consequently, new land use patterns have emerged.

Transportation infrastructure

Accessibility has already been mentioned as one of the locational aspects, influencing the emerging landscapes of the post-communist rural-urban region. The rail-oriented urban fingers, separated by green wedges, a regional structure which has come into existence in the late 19th century and has existed since, is currently tarnishing. The

rise in car ownership, which had started in the late 1970s, has changed accessibility patterns, making the green wedges very attractive for developers (Brzezinski & Suchorzewski, 2004; Czerny *et al*., 2002; Niemczyk, 1998; Interviewee F). However, since public transport was the major transportation means during communism, the regional road infrastructure faces capacity problems. Moreover, the radial structure of the road system – a relic of the communist era – leads the major access roads right into the city, without providing enough peri-urban interconnections, for which the demand is growing. Consequently, the city centre still is one of the most accessible areas in the region, since not only the road, but also the public transport network is centric-radial structured. However, those who can afford it will use their car, a prominent status symbol, and neglect the public transport system, which has declined through years of overdue maintenance (Bertaud & Bertaud, 2002; Brezezinski & Suchorzewski, 2004; Grochowski, 2002; Lisowski, 2002). Moreover, the current decentralization of job and retail locations, following the residential decentralisation, leads to new transportation patterns, revealing lacunas in the road system. Several measures have been taken by the Warsaw municipality to reduce traffic problems, such as charges for parking since 1999, the construction of new circumferential roads (currently under construction), and the stimulation of urban public transport (since 1995) (Brzezinski & Suchorzewski, 2004; Lisowski, 2002; Interviewee A). Of the latter, the Warsaw subway is an example, further elaborated on in the micro case in subsection 5.3.

Despite efforts of individual municipalities to cope with infrastructural capacity problems, the lack of inter-municipal coordination leads to rather incoherent developments. The lack of regional coordination results in local policies which are less effective. For instance, residential developments are not always supported with the necessary infrastructure connections, causing congestions on existing road connections. Another example is the emerging network of bus connections with Warsaw, set up by local fringe authorities, to enable their citizen to commute to their jobs (which can be seen as self-organisation). However, since these buses end up in the same congestion as private car users, their attractivity is rather low. Furthermore, the attractive subway line is confined to the Warsaw municipality, whereas it could have offered great potential for suburban towns if it would have been extended several kilometres (Bertaud & Bertaud, 2000; Brezezinski & Suchorzewski, 2004; Czarniawska, 2000; Niemczyk, 1998; Interviewee D).

Conclusively, for creating enhanced regional public transport systems and extending and improving the regional road network, regional governmental coordination seems vital. Moreover, a well-developed regional public transport system can offer a promising alternative for commuters, especially since Warsaw CBD still accounts for the majority of the job and service functions (Bertaud & Bertaud, 2000; Brezezinski & Suchorzewski, 2004). A first step taken by the municipality of Warsaw is the upgrading of the deteriorated tramways and fleet renewal since 1995 (Brezezinski & Suchorzewski, 2004). Extending these actions to inter-municipal tram and train connections, as well as constructing new regional public transport infrastructure, could be an important second step. Similar effects could be expected as near the metro line (Bertaud & Bertaud, 2000; see section 5.3).

Conclusion

After the tipping point, a sudden downfall of the communist era, the peri-urban area has been characterised by high dynamics of a new kind, driven by mainly market principles. This can be seen as a strong pull towards the

emergence of a metropolitan area in conformity with the global service economy. This pull was strengthened by the competition between municipalities to attract new developments, drastically different from the rather restrictive centrally planned economy. Hereby, private parties gained a dominant position in peri-urban dynamics, resulting in a misbalance: public parties are generally lagging behind the high speed private developments. A regional functional decentralisation process characterises the post-communist developments, primarily residential and retail functions, and to a lesser degree office locations emerge in the peri-urban area, increasing the city's functional relationship with its surroundings. Although the quality of the individual building is generally high, the public-private misbalance has resulted in a rather low coherence in regional developments. Even the compatibility of individual developments is questioned by several Polish architects and urban planners, quoted by Kreja (2006, p.269): "Despite having filled the landscape with buildings, the reality represents only absurd urbanisation. Neither an empty field, nor a town, but a frightening townscape of the future consisting of incompatible buildings, located either too far from or too close to one another". Hence, the peri-urban area has become something difficult to typify, as it consists of a complex mixture of rural and urban functions, where cohesion and compatibility seem to be rather problematic issues.

Pull:	**Push:**
Decentralisation (inter-municipal competition)	Has become pull
Global service economy	
Socio-economic changes, e.g. car ownership	

4.7. Future developments

For the near future, the process of functional regional decentralisation is expected to continue, increasing the peri-urban share of residential and especially retail and office locations. The past decade, public guidance of dynamics in the peri-urban area has been slowly increasing with ad hoc adjustments of development regulations. However, in order to enhance the sustainability of developments, public coordination on a metropolitan (meso) level seems necessary. Although the need for such a governmental metropolitan entity is broadly acknowledged (Grochowski, 2002; Kulesza, 2001), even by the Warsaw municipality (Bertaud & Bertaud, 2000), there seems to be a lack of will to create a Warsaw Metropolitan Area (WMA). Fear of increasing dominance of the city of Warsaw seems to play a role at national as well as at local scale. Nationally, this has led to a split in policy: there seems to be unwillingness to institutionalise the WMA, meanwhile the 2003 Spatial Planning Act requires that a WMA spatial plan should be created. Consequently, the WMA spatial plan, created by the Masovia voivodeship, lacks legal and public support (Piwowarczyk, 2004; Slawinski, 2006; Interviewee D). Locally, municipalities, especially the relatively rich ones, are afraid to lose autonomy and tax revenue to Warsaw (Interviewee A; F). Despite these obstacles, one is expecting the WMA as a governmental layer to become institutionalised in the near future (Kulesza, 2001; Interviewee A; D; H). This could mark the start of a stabilisation phase in the peri-urban developments, as competition between local authorities might be decreased, balancing the influence of public and private actors.

Apart from the institutionalisation of a metropolitan government, further institutional changes are necessary to strengthen the position of public authorities in order to enable them to exert more influence on spatial-economic dynamics. However, Interviewee C, a professor at the Technical University of Warsaw, questions whether public

support for increased governmental power exists, bearing in mind the communist history of Poland (see also Plaza, 2001). A few other interviewees indicate that they expect that public consciousness of negative effects of the privately dominated dynamics is increasing, which forms a basis for enhanced public governance (Interviewee F; G). Illustrative are the actions taken to ensure proper preparations for the European Football Championships in 2012, for which extensive infrastructural improvements are necessary. Temporary legislative changes, including easier expropriation, are included (Berezowska, 2008). Whether the Euro 2012 will function as a triggering event with respect to the legal position of public authorities remains a question to be answered in due time.

However, also within the existing institutional framework some improvements could be made in Warsaw's spatial management. Covering the entire municipality with local land use plans is seen as a vital first step (Bertaud & Bertaud, 2000). However, for this expansion of public managerial capacity is necessary, as well as increased coordination between different sectors of planning, such as transport planning and land allocation (Interviewee G). In short, the Polish public law and public actors are in a process of maturing, co-evolving and adapting to the post-communist reality and will continue to do so, probably resulting in an increased balance between public and private parties.

A great concern for the future, regards the environmental quality of the metropolitan area, although the pollution has significantly decreased thanks to the extensive deindustrialisation. After 1990 the acreage of green areas (especially agricultural) in the region drastically decreased under pressure of urban developments, driven by socio-economic changes, such as increased wealth, smaller household size and, related to that, the increase in land consumption per capita. Paradoxically, the socio-economic changes include higher demands in environmental quality, such as easy access to recreational green areas. Typically, parks and forests near Warsaw are flushed with recreating urban dwellers in the weekends (Crowley, 2003; Interviewee F; G). However, high profits in the developing sector and low profits in the agricultural sector put pressure on relatively central green areas (Wasilewski & Krukowski, 2002). To safeguard them from being developed, public authorities will probably have to step in. Visualising the positive effect on land value of nearby urban parks might be a way to legitimise the retaining of currently undeveloped fringe areas (Szulczewska & Kaliszuk, 2008).

A more autonomous trend, which could be utilised to enhance the viability of rural areas in urban regions, is the rise of the 'agritourism'. In Poland the number of farms exploiting such business rose from 1,000 to 11,000 between 1993 and 2000. However, in the Warsaw region this development seems to lag behind compared to several other Polish regions (Bánski, 2006). A major reason is the high land value because of the well running service economy in Warsaw, causing many farmers to sit and wait for a developer to offer a good price for their land (Wasilewski & Krukowski, 2002). Stimulating farmers in strategic ecological and recreational locations to join the 'agritourism' business might be a way to increase the profitability of agricultural areas, by making them pluri-potential, i.e. not dependent on a single agricultural economy. Thereby it offers alternatives for rural-to-urban land conversion for the increasingly high-valued rural parts of the metropolitan region. Moreover, such a policy would fit into the picture of increasing integration of rural and urban functions in the peri-urban zone. The 'agritourism' business seems a logic continuance of the leisure economy which is currently unfolding in the

Warsaw region, exemplified by the construction of hotels, recreational and leisure provisions chiefly in the city and near the Zegrzyńskie lake, 20 kilometres north of Warsaw (Grzywiński & Hałacińska, 2007; Real Estate Voice, 2007; Szymanska, 2003). Apart from the 'lakeside leisure', the leisure in the region seems to be confined to urban forms of leisure, or as Kreja (2006, p.269) calls it: 'non-retail forms of urban consumption'. This offers opportunities for rural oriented leisure as this sector is identified as one of the fastest growing sectors in the region (Grzywiński & Hałacińska, 2007).

4.8. Conclusion

In this chapter it is attempted to unravel the complex interplay of processes influencing Warsaw's peri-urban area. Studying the post-war developments of the peri-urban area, several phases of change have been distinguished. The three phases during communism were characterised by extensive governmentally induced developments and the suppression of autonomous developments. The extensive supply of social housing and investments in heavy industries formed a strong induced pull factor, causing the peri-urban area to become rather dependent on a mono-economy. Peri-urban dynamics during communism were largely confined to planned developments. Nevertheless, differences in functional centralisation and (induced) decentralisation in the region can be recognised, as well as differences in quality of the supply oriented developments. The last phase of communism was characterised by a regional decline, which caused the emergence of autonomous push factors opposing the induced pull factors. These included autonomous deindustrialisation and a modest rise in demand driven single family house constructions, heralding an era of new spatial-economic developments.

The tipping point, causing radical changes at a macro level, involved extensive changes in the pull factors: induced industrial pull factors disappeared and were replaced by more autonomous pull factors towards the global service economy, e.g. the reintroduction of the market economy and municipal competition for investments. In this phase the system is out of balance, causing an acceleration in peri-urban dynamics, predominantly driven by private investors anticipating on a large surplus demand. The quality of individual developments is significantly higher than during communism and seems to increase with a shrinking surplus demand. However, as the public-private relation is out of balance, regional cohesion and compatibility between developments is missing. This is expected to increase when the public-private balance is restored, during the approaching stabilisation phase. The start of this phase could be marked with the institutionalisation of the Warsaw Metropolitan Area, which would indicate an institutional and organisational adaptation to the contemporary functional relations, existing in the Warsaw rural-urban-region. Moreover, this would enable public actors to interfere in the peri-urban dynamics, in order to enhance sustainable structures to emerge.

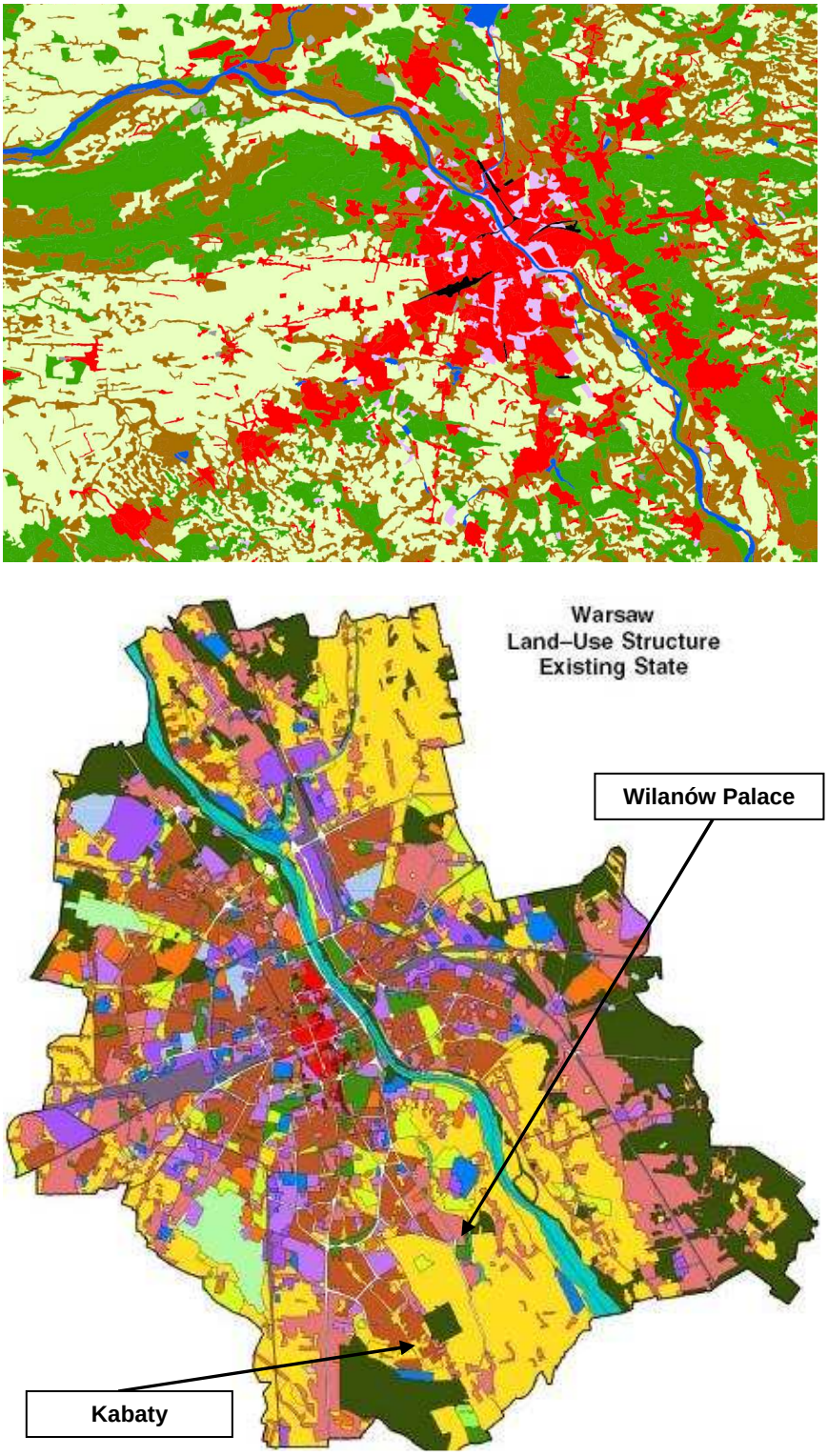
The next chapter pays attention to two micro cases in the Warsaw region, which provide insight in the micro level and its relation with the macro and meso processes of change. This is followed by chapter six, which reflects on the analysis of multi-level change in the peri-urban area and the usefulness the theoretical framework for this analysis.

Chapter 5: Micro cases

Marc Beeftink

5.1. Introduction

Figure 5.1: Map of the Warsaw metropolitan area and a map of the municipality of Warsaw, indicating the two micro cases



The micro level, concerning the parts of the system, is of importance to show how the fundamental change of the peri-urban area affects the local life and how developments on the micro level drive change. This section introduces two micro cases: Wilanów Palace, a 17th century palace several kilometres south of the Warsaw city centre; and Kabaty, the south end station of the subway line of Warsaw (see Figure 5.1). Both cases are located in the in 1951 acquired territories of Warsaw, south of the city. The first case, displaying early forms of rural-urban relations, offers interesting changes through time, driven by changes on different levels. The second case, Kabaty, shows an exceptional form of governmental influence after 1990. Without being fully comprehensive, the two micro cases provide insight how macro and meso level processes can develop, influenced by micro factors.

5.2. The royal route to Wilanów Palace

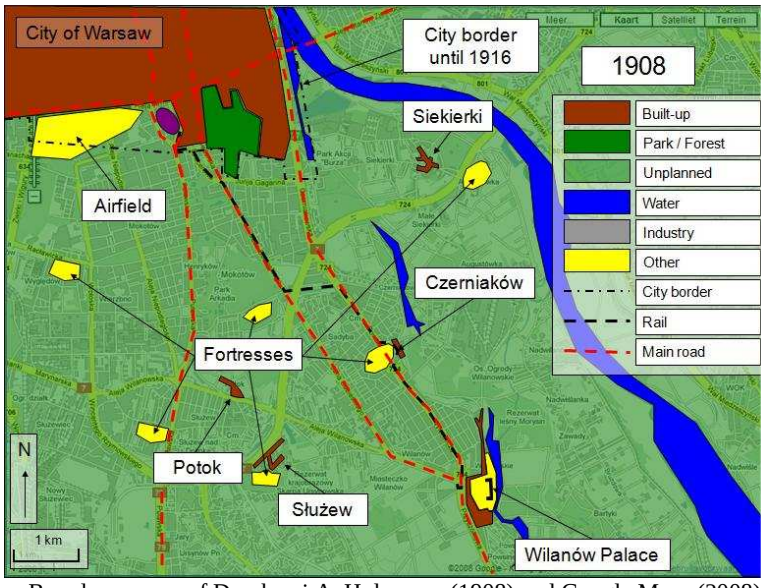
Wilanów is one of the oldest settlements in the vicinity of Warsaw, first mentioned in the 13th century as Milanów or Milanowo. The Wilanów Palace (Figure 5.2) was built and extended between 1677 and 1729. Later developments included the surrounding park (1791) and the Riding School (1840s). Since the late 18th century, the Wilanów palace is the end of the 18 km Royal Route, a former prestigious communication route, starting at the Castle Square in the old city centre of Warsaw. The village of Wilanów is known as wealthy suburb of Warsaw as from the 18th century and a popular place to spend the holidays for the Polish well-off (INVI & PROKOM; Świątek, 2006).

Figure 5.2: Wilanów Palace

Beeftink (2008)

In the 19th century, the time of industrialisation in Warsaw, Wilanów was connected with a narrow-gauge railway line, running from Unii Lubelskiej Square (in those days located at the urban fringe of the city of Warsaw) to Wilanów (a route of approximately 8 km). The line, initially horse-drawn, proved to be a success and was improved to a steam-drawn train at the end of the 19th century. Although the Wilanów village cannot be seen as one of the 'urban fingers', rather a part of a green wedge, the narrow-gauge rail connection with Warsaw did lead to some functional changes; instead of being solely a place of residence for the well-off, with the narrow-gauge rail connection, the number of blue collar workers of Warsaw's industries increased (Świątek, 2006). This is probably partly the effect of the construction restrictions near the belt of fortifications, which were numerously

Figure 5.3: Map of the area between the city of Warsaw and Wilanów Palace in 1908

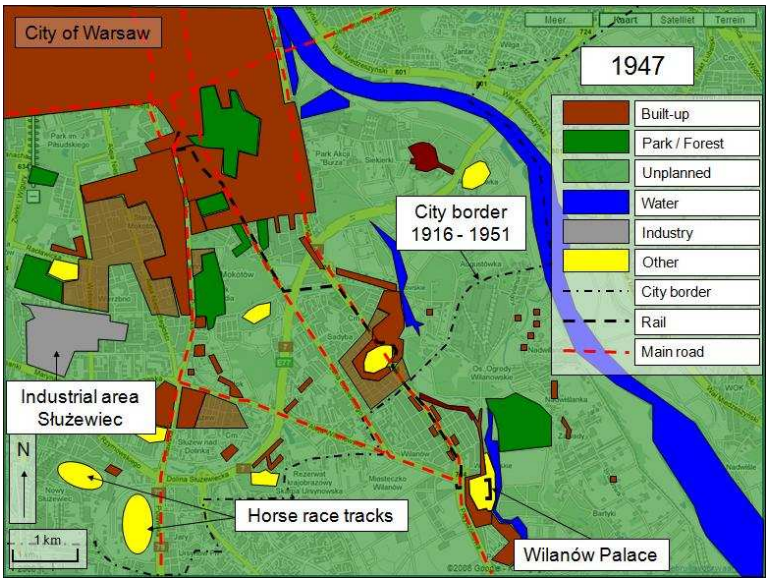


Based on a map of Druckerei A. Holzmann (1908) and Google Maps (2008)

present in the area between Wilanów and Warsaw see Figure 5.3). Small towns closer to Warsaw, such as Czerniaków, were unable to extend as a result, directing commuters to more distant locations.

Also the city of Warsaw was unable to transcend its municipal borders, due to the presence of the fortifications. As a result, by the turn of the twentieth century, Warsaw's southern urban fringe reflected a rather distinct divide between rural and urban functions. The airfield and Łazienkowski Park, both located at the fringe, can be seen as exceptions. The rural areas south of Warsaw functioned mainly as agricultural and (water) meadow land (Świątek, 2006). Effects of the industrialisation in this area were thus limited to the improvement of the narrow-gauge rail connection and the inflow of blue-collar workers in Wilanów, since industrial areas mushroomed near the rail connections in the western fringe of the city (Kaczorowski, 1965). The situation of the area between Warsaw and Wilanów in 1908 is depicted in Figure 5.3.

Figure 5.4: Map of the area between the city of Warsaw and Wilanów Palace in 1947



Based on a map of Siegarnia I Antykwariat & Pfeiffer I W. Mrozowski (1947) and Google Maps (2008).

In 1911 building restrictions near the fortifications were abolished, after which the urban growth transgressed the municipal boundary. In 1916 the municipal border was extended, after which the city could truly expand. Small villages near the fortresses, now under Warsaw's jurisdiction, were able to grow as well, especially those along the narrow-gauge rail and access roads. However, the size of this development was relatively small, compared to the rail connected suburbs, forming the urban fingers. Also Wilanów, now bordering the Warsaw territory, faced some urban growth. However, Czerniaków, now falling within the ambit of Warsaw's development plans, grew significantly faster, mainly attracting blue collar workers (Figure 5.4).

The extension of the municipal border and the abolishment of the building restrictions led to the outplacement of urban functions into the here considered peri-urban area. In the 1920s, a new industrial area (Służewiec) was created. In 1933 the airfield was relocated to a more distant location, in order to be able to extend and to avoid nuisance. Other land use changes involved the construction of two horse race tracks and the protection of several natural amenities in the 1930s, see Figure 5.4.

On a micro level, we see that the abolishment of the building restrictions and the extension of the municipality's territory caused the distinct urban fringe to transform into a transitional area. The predominantly rural area changed into a more fragmented pattern of built and non-built areas. Next to agricultural functions, industrial,

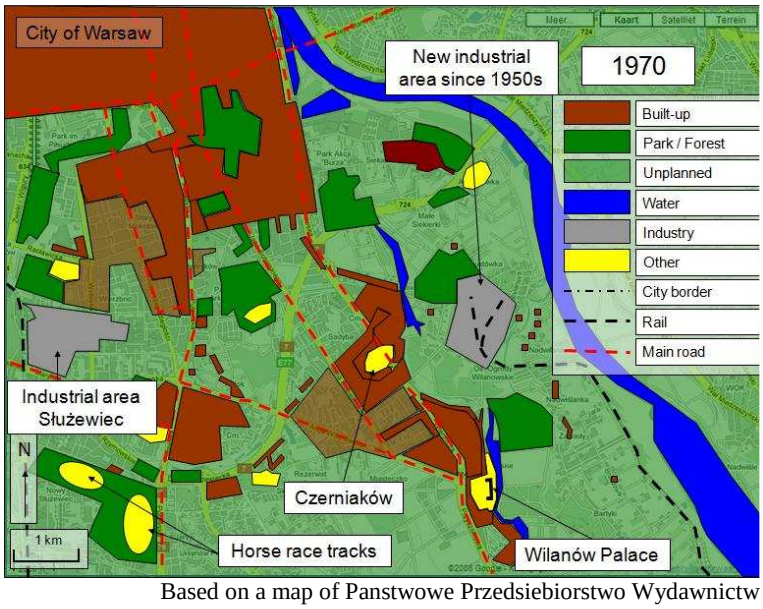
residential and recreational functions were situated in the peri-urban area. The protection of natural amenities indicates an increasing appreciation of recreational green areas. By the time World War II broke out, Wilanow Palace was not only connected by the narrow-gauge rail, also ribbon developments more or less linked Wilanów with the city of Warsaw.

Since the point of gravity of reconstruction activities lay in the city itself, peri-urban dynamics were relatively low. This was engraved by the communalisation of the entire municipal territory in 1945, giving the authorities full control of peri-urban dynamics within the municipal borders. In our micro case, the Służewiec industrial area was redeveloped and a new industrial area was opened, a few kilometres north of Wilanow palace (Świątek, 2006). In 1951, Wilanów became part of the Warsaw municipality, which tripled its surface area. Agricultural areas largely stayed in private hands, housing construction however became a complete governmental affair. Several residential areas were constructed in the peri-urban area, clustered around existing villages. This was a rather direct result of governmental deconcentration efforts, avoiding the excessive densities of the pre-war situation.

Apart from the several industrial and residential developments in the studied area, other relevant changes did occur. For instance, the increasing competition of bus connections caused mainly the smaller rail routes to experience a loss of passengers. As a result, the narrow-gauge rail connection between Wilanów and Warsaw was closed in 1957 (PTKW, 2008). This was one of the first shifts from rail to road transportation, which became rather influential in structuring peri-urban dynamics with the increase of private car ownership in the 1980s. However, since constructions between 1955 and 1970 within the Warsaw limits were mostly confined to the inner city as a result of the deglomeration policy, no structural changes became apparent yet.

Another interesting development starting in the late 1950s is the allocation of several parks in the peri-urban area. This started with the creation of 'parks of culture and leisure', followed by several other recreation oriented policies. Some parks have actually been developed; others were only retained fallow lands to eventually become built-up (Szulczewska & Kaliszuk, 2008). Nevertheless, the area in between Wilanów and Warsaw was presumed to partially function as an urban recreational area, rather than an agricultural function (see Figure 5.5).

Figure 5.5: Map of the area between the city of Warsaw and Wilanów Palace in 1970



Based on a map of Panstwowe Przedsiebiorstwo Wydawnictw Kartograficznych (1970) and Google Maps (2008).

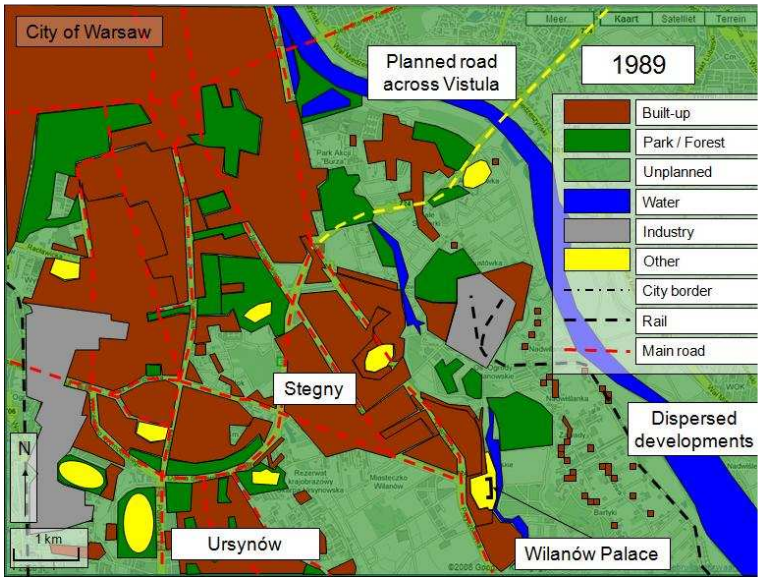
The potential of the Wilanów area, with regard to urban recreation, was also acknowledged with the emphasis on its historical relation with Warsaw: 'the royal route was re-established, accompanied with the recreation of monuments along the route' (Crowley, 2003, p. 68). Yet, the attempts to employ such potentials were neither supported with flanking policy, nor with socio-economic developments.

Figure 5.7: Stegny housing estate in 1977

Crowley, 2003, p.177

As a result of the centralisation trend following the deglomeration policy, residential and industrial developments increased at the fringes of the city. In this micro case, the Służewiec industrial area was extended southward. More interestingly are the vast numbers of large housing estates which were constructed in the 1970s and 1980s, extending the city to the south, filling up fallow lands and agricultural areas, including those along the route to Wilanów. The supply oriented housing constructions generally lacked connection with the existing demand for dwelling types, which included the single family home. Moreover, the quality of the developments and the provision of relevant services suffered deeply from the decreasing state budget for housing. Crowley pictures the situation: 'the lack of services added to the sense of disconnection between the grey panel blocks and the landscape in which they were built. Getting to a bus stop or the nearest shop involved a walk across a dingy wasteland of weeds growing on the mounds of rubble and earth waiting to be landscaped, avoiding the puddle and the broken paving stones' (2003, p. 176; see Figure 5.7; Figure 5.6).

Figure 5.6: Map of the area between the city of Warsaw and Wilanów Palace in 1989



Based on a map of Panstwowe Przedsiebiorstwo Wydawnictw Kartograficznych (1989) and Google Maps (2008).

Comparable to the situation on the meso level, governmentally induced developments of the 1970s and 1980s caused a decline in the quality of the area considered in this micro case. Furthermore, the area in between Wilanów Palace and Warsaw's urban fringe, which had become a mix of urban and rural functions, became predominantly urban. As a result, the urban fringe of Warsaw became increasingly distinct (see Figure 5.6). Presumably, the interest in urban recreation diminished, since the economic crises gave public authorities and city dwellers other priorities.

The increase in car usage in the 1970s and 1980s led to the planning of a new bridge across the river Vistula, which was one of the first roads not directing traffic to the city centre (Crowley, 2003; Niemczyk, 1998; see Figure 5.6). This could also be seen as an acknowledgement of an increase in the demand of traffic bypassing the inner city. Constructions only started in the year 2000, (Połoński 2006). The increase in car ownership enabled more people to settle in areas which were hard to access by public transport. An increase in the construction of single-family houses took place, a process which was recognised at the meso level as well. This development took on a larger scale, after the legalisation of private single-family housing construction in 1976. This development took place in the area east of Wilanów Palace, where as a result a new fringe area emerged (indicated with 'Dispersed developments' in Figure 5.6). By the end of the 1980s, the areas was characterised by a mix of residential and small-scale agricultural functions.

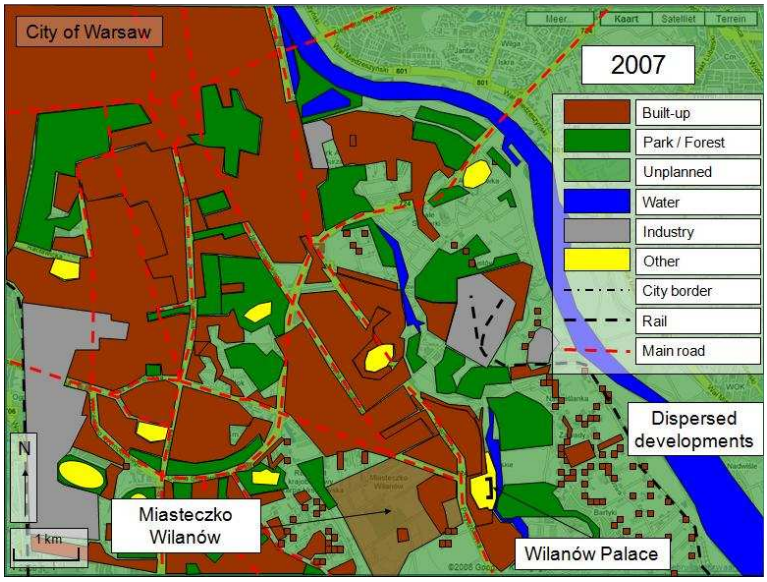
Figure 5.8: Dispersed residential developments in the predominantly agricultural area, near the crossing of the Włoki and Prętowa road, in Wilanów district, Warsaw

Beeftink, 2008

The macro and meso tipping point of 1989 can be considered a tipping point on the micro level as well. State supplied housing halted and the construction of residential functions in the area came in private hands. This also included a turn in the drivers of housing developments: from supply to demand oriented. In this micro case, the significant increase in housing quality is striking, which is probably the effect of higher quality demand as well as a strict construction law (Interviewee F). In the area east of Wilanów Palace, the development of private single-family houses accelerated, enabled by the increase in wealth and car ownership. Deducing from the high quality housing which can be found here, this is an area where the better-off construct their residence. Governmental interference in the private developments is nil, a result of the absence of a local land use plan (Interviewee F). Currently, the area is a typical mix of extensive agricultural fields, glasshouses and single-family houses, dating from the late communist and post-communist eras. This fuzzy landscape does justice to the characteristics of the peri-urban landscape; it remains unclear whether it can be seen as rural or urban (Figure 5.8; see also Figure 5.9). As we have seen in the previous chapter, the self-construction of dwellings is a relatively small, but significant proportion of all housing constructions in the region. The fact that this can be found in this area is probably related to the fragmented land ownership and the presence of several urban structures at the moment of the transformation in 1989. This makes it less suitable for developing large schemes, which contrasts sharply with the developments a few kilometres to the west, at the other side of the Wilanów Palace.

The area in front of the Wilanów Palace is currently displaying one of the largest urban developments in the Warsaw region. This area was property of a single land owner: the Warsaw Agricultural University. In 1999 two

Figure 5.9: Map of the area between the city of Warsaw and Wilanów Palace in 2007



Based on a map of Jokart (2007) and Google Maps (2008)

private developers obtained the 170 hectares of mainly meadow land for 92 million PLN, after which the developments could start in 2002 (Wojtczuk, 2005). 30,000 dwellings, mainly in multi-family building blocks, are currently being constructed. The new neighbourhood, called Miasteczko Wilanów (Wilanów Town, see Figure 5.9 and Figure 5.10), will contain offices, recreation, leisure, and retail services, next to the 30,000 housing units. Emphasising the role of environmental quality and recreation / leisure amenities, the developers ensure that more than 50% of the site will be covered with public spaces, parks and gardens (PROKOM & INVI). The developers utilise the recreational potentials of the Wilanów area, extensively referring to Wilanów's recreational history in their promotion materials.

Figure 5.10: Impression of Miasteczko Wilanów, a residential neighbourhood for approximately 30,000 residents currently under construction

Beeftink, 2008

The development of Miasteczko Wilanów illustrates the potentials of Warsaw's peri-urban area. By linking residential and leisure developments, rural and urban functions are purposely connected. Meanwhile, the investors are assured of popularity of such developments, resulting in migration from the central city to the peri-urban area (REAS, 2008). The role of the government in the development is rather modest, which leads to inadequate cohesion of Miasteczko Wilanów with the rest of the region, especially from a mobility perspective.

The current development plans lack high quality public transport possibilities, although it is likely that most future inhabitants will have to commute to the city centre. While the Warsaw authorities would like to see a tram connection between Miasteczko Wilanów and the city centre, they have not been in power to force the private developers to include space for a tram connection in their plans. As a result, a second best alternative is considered: a fast bus connection. However, this does not have the same quality and attractiveness as a tram connection (Interviewee H). Although the developments after 1990 might have been too fast for the local government to anticipate on, it must be said that the quality of the housing of this period (both individual houses and Miasteczko Wilanów) in the area surrounding Wilanów Palace is rather high – definitely exceeding that of the period before 1990. A strict national building law seems to be the cause of this (Interviewee F). Higher quality demand driven development might also play a role.

Concluding, the micro case of the area surrounding Wilanów Palace shows that the developments between the communist and post-communist period differ substantially. Furthermore, when regarding the developments of the past two decades, we see that local characteristics can have extensive consequences for the characteristics of the development. This can be seen in relation with path dependency, a notion from complexity theory. In short, this indicates that events in the past confine the possible pathways of the present and the future. Furthermore, we can conclude that the Wilanów area is full of recreational and leisure potentials. The restoration of the Royal Route is an example of an attempt to utilise these potential. However, with the more autonomous developments of single family houses in the rural area and the example of Miasteczko Wilanów, these potentials seem to have been exploited more extensively. Finally, we can conclude that the area experienced structural and fundamental spatial changes during the observed period. Although some areas were transformed from rural to urban functions, some areas have retained their rural character. The connection with the macro and meso level can be identified, especially with regard to the acceleration of private developments after 1990.

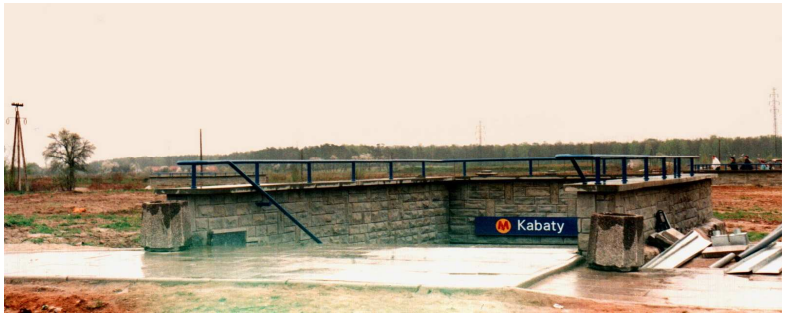
5.3. Kabaty subway station

Kabaty, the most southern subway station of Warsaw, is situated in the south in the municipality of Warsaw (see Figure 5.1), near the village Kabaty and Kabaty Forest, which is situated at the administrative border of Warsaw. Until 1995 the area consisted mainly of fallow and agricultural land. Although the Kabaty area became part of Warsaw's territory in 1951, Warsaw's morphological fringe was still several kilometres away in the early 1990s. Figure 5.11 shows the brand new north entrance of the Kabaty subway station and the fringe of the city, at the horizon in 1995. The Kabaty station is situated, in what seems the middle of nowhere (see also Figure 5.12).

Figure 5.11: The north entrance of the Kabaty subway station in 1995, photo taken in the direction of the city of Warsaw

Huber, 1995

Figure 5.12: The north entrance of the Kabaty subway station, still under construction in 1995, three days after opening of the first section of the subway line. The southern entrance and the Kabaty Forest can be seen in the background



Dembinski, 1995

Figure 5.13: The Kabaty subway station, with the Kabaty forest in the background. On the left side a hypermarket of TESCO is visible, on the right side residential estates can be seen

Beeftink, 2008

Figure 5.14: The current fringe of Warsaw, just south of Kabaty subway station, showing residential estates, facing Kabaty forest on the left side of the photograph

Beeftink, 2008

This, at first sight, somewhat curious location for a metro station, turned out to be a major amplifier of developments. The idea of creating a metro line in north-south direction dated from many decades ago. Constructions began in 1983, twelve years before the opening. The major drivers for this decision were the deteriorated state of the public transport and the rapidly growing congestion on the roads, caused by increasing numbers of cars (Czarniawska, 2000).

When currently (13 years later) visiting the area surrounding the Kabaty subway station, it is hard to believe that the photographs are taken at the same location (Figure 5.13 is taken in the same direction as Figure 5.12). The first development in the area, after road infrastructure had been provided for, was a large hypermarket (more than 11.000 square meters and over 500 parking spaces). This can be seen as an exception for the Warsaw municipality as most hypermarkets were located just outside Warsaw's territory. Figure 5.14 shows the southern fringe of the urban developments near the Kabaty metro station, which is blocked from view by the apartment blocks.

The area is now completely connected to the city of Warsaw with urban structures, about two kilometres in width, like an urban finger. In a city with severe traffic congestions, the value of the metro line proves to be enormous. Taking the subway, one can travel comfortably to the city centre within 20 minutes. Moreover, Kabaty forest provides a green recreational area nearby, which is unlikely to be built up, because of its protected status. This forest is crowded with urban dwellers during the weekends (Interviewee F). Furthermore, road infrastructure connects the area with the city centre. Because this is not a road for southbound through traffic, it is not as congested as for example the access road near Wilanów Palace. This higher value is reflected in density patterns near the metro stations, this is on average higher than locations with a similar distance from the city centre (Bertaud & Bertaud, 2000).

The construction of the subway line has definitely accelerated the developments of Ursynów (Interviewee G). A better example of guiding autonomous developments since 1990 is probably hard to find in the Warsaw region. The provision of public transport and infrastructure can be seen as a powerful tool of spatial management; however it is also an expensive one. Public-private partnerships seem necessary since local authorities are not able to develop such expensive infrastructure. Concerning the rural-urban relations, it could be argued that the area surrounding the Kabaty metro station has become profoundly urban; in a functional, organisational and institutional sense it is part of the city of Warsaw.

5.4. Conclusion

Having considered these two micro cases, we have gained additional insight in peri-urban land use relationship changes in the Warsaw region. What strikes the most is the difference in level of relationships with the city of Warsaw between the two micro cases until the 1990s. Although both cases are situated more or less the same distance from the city centre, the Wilanów area is by far more connected to the city. This is mainly caused by a main route to the south, cutting through the Wilanów area. Interrelations were mainly the result of residential functions in the Wilanów area, with the Wilanów Palace as the wealthiest and oldest example. During the industrialising periods (second half of the 19th century and during the communist era), this remained the main part of the connection with Warsaw, although the type of residence changed a bit. Relatively wealthy dwellings were supplemented with working-class houses. Meanwhile Kabaty remained relatively undeveloped. In line with our meso analysis, the absence of rail connections with the city of Warsaw seems to have hampered industrial developments in both micro cases, although some exceptions can be found.

A significant increase in the relationship with the city for both micro cases becomes apparent after the macro tipping point of 1989. Socio-economic changes, such as the rise of the tertiary economy, increasing wealth, and rising car ownership are examples of important drivers of land use change in the two micro cases. Kabaty became connected to Warsaw by subway and road, whereby Kabaty became even better connected to Warsaw than Wilanów. Since 1990 developments have been similar in both micro cases, with large, high quality multi-family houses and third economy developments. This indicates the significance of macro influences on the micro level. Meanwhile, the differences between the areas east and west of Wilanów Palace show the importance of local (historical) factors for contemporary developments.

In general, the economic transformation and the growth of the tertiary sector seem to cause the majority of land use relationship changes in the peri-urban area. In the past, the infrastructural connections on micro level have proven to be vital for the development of the area. It seems that this will be similar in the near future.

Chapter 6: Synthesis & Conclusion

Marc Beeftink

6.1. Introduction

In this chapter, the findings of the case study analysis are linked with the posed theory of chapter two. The objective of this chapter is to provide insight to what extent the theory could be useful for understanding and analysing developments of the peri-urban area. First, the assumed interplay between context and peri-urban area is elaborated on, including notions from complexity theory, such as processes of adaptation, co-evolution and self-organisation, which are linked to the case study analysis. Second, the distinguished phases of development, as presented in chapter four, are compared to the phases of a transition. Third, within the phases, the role of push and pull factors is explained and explored. Fourth and final, some general remarks concerning the use of the model of transition in analysing peri-urban developments are made. This chapter is followed by a final chapter in which several theoretical suggestions are made.

6.2. Warsaw's peri-urban area as a complex adaptive system

In this study, where fundamental changes of the peri-urban area are considered as transitions, the underlying assumption is made that the peri-urban area can be seen as a complex adaptive system. In this section, the added value of this non-linear perspective is illustrated with examples from the case study analysis. The role of the context is elaborated on first, followed by, *inter alia*, the discussion of several notions from complexity theory.

A prominent feature of class IV, complex adaptive systems, distinguishing them from class I to III systems, is the ability to adapt to an influential, altering context. Macro influences on Warsaw's peri-urban area consist mainly of political, economic and technological changes. As becomes clear from the historical overview of section 3.2, contextual changes have influenced the developments on a regional level already in the 19th century, such as the combination of political, economic and technological changes leading to the emergence of an urban finger structure. Focussing on the post-war context of the peri-urban area, it becomes clear that the period of communism and the centrally planned industrial economy left its mark on peri-urban developments. Subsequently, after the tipping point, the fall of communism which included extensive governmental decentralisation and the disappearance of the Iron Curtain, the global service economy formed the economic context of Warsaw's peri-urban area. Apart from the exact influence of the macro developments on the peri-urban area, it is an interesting observation that the context has changed rather spasmodically. Not only the fall of communism was such a radical change of context, also earlier contextual changes were rather abrupt (see section 3.2). This has several implications: firstly, adaptation of the meso and micro level followed these changes, rather than evolving simultaneously with macro developments. Secondly, such radical changes were and are hard to predict let alone to influence. I.e. most contextual changes evolved rather autonomously, which is an important observation for planners. This is referred to in the final chapter.

However, several remarks should be made with respect to the role of the macro level on peri-urban changes. The interplay between the macro, meso and micro levels has been a bit more complicated than an autonomously changing context, followed by the adaptation of the meso and micro level. This can be clarified with an example

from the case study analysis: in the 1970s several areas with dispersed single family houses emerged in the peri-urban area, constructed by the private sector. This can be seen as the result of changed behaviour of individual actors, influenced by macro changes (such as economic and technological changes, leading to increasing car ownership and a desire for individuality). However, this development, occurring on micro level, was not in line with national legislation. When this development increased in size, and became apparent on the meso level, in 1976 national legislation was adapted to this relatively autonomous development, allowing the private construction of single family housing (Crowley, 2003). This can be seen as an ad hoc adaptation of the institutional context to occurrences on a micro and meso level – although this phenomenon also took place in other regions (Ruoppila, 2004). After the sudden disappearance of communism in 1989, a macro institutional and organisational event, developments on micro level, such as the single family housing, accelerated. On the meso level, these developments, driven by new location principles, lead to the rapidly tarnishing of the urban finger structure. We conclude that the three layers and dimensions are all interrelated and relevant for the transition of the peri-urban area.

Several notions from complexity theory can be traced in the developments within the Warsaw region. When searching for co-evolutionary processes within the peri-urban area, the contemporary self-reinforcing process of increasing car ownership and road oriented developments can function as an example. Increasing car ownership leads to different accessibility patterns. Private developers therefore choose car-accessible locations for their developments. This in turn increases the car ownership and car ridership, as more locations become accessible by car. This self-reinforcing process is a phenomenon occurring all over the world (see for instance Kaufmann & Jemelin, 2003). Occurrences of self-organisation are visible in Warsaw's peri-urban area as well. A rather genuine example is the current regional bus network, connecting the peri-urban area of surrounding municipalities with the city of Warsaw. Without a regional plan or organisation, the network has emerged from the actions of individual municipalities, providing bus connections for their commuting inhabitants. Through the notion of self-organisation, new structures can emerge in the peri-urban area.

With the examples of an altering context, adaptive micro and meso levels of the peri-urban area, and the processes of co-evolution and self-organisation, it has become clear that Warsaw's peri-urban area shows resemblance with the theoretical model of a complex adaptive system. These characteristics result in a non-linear progression of the peri-urban area. The next section explores whether the non-linear perspective offers valuable insights.

6.3. Non-linearity in Warsaw's peri-urban area

"What is the linkage between the concept of transition and rural urban relationship changes?" is the first sub question of this research. In other words: could a non-linear perspective offer additional understanding of the observed fundamental change in the peri-urban area? In the previous section we have concluded that Warsaw's peri-urban area showed similar characteristics as complex adaptive systems. In this section, we discuss whether the observed changes could be better understood when regarding it as a transition.

In the case study analysis we have seen that the fundamental changes in the peri-urban area include both qualitative and quantitative changes. In this section we focus on the phases of development, which are vital elements of the model of transition. Important aspects are the 'old' and 'new' levels of stability (dynamic equilibriums), in between which a period of high dynamics takes place (see Figure 2.3 and Figure 2.4). When regarding the post-war developments of Warsaw's peri-urban area, we can identify two different levels of stability. The peri-urban area during communism, a predominantly agricultural peri-urban area occasionally alternated with heavy industrial complexes, could be seen as the 'old' level of stability. Although during the first post-war years, the peri-urban area had to become embedded in its context and during the last years of communism it became increasingly detached from the level of stability, most changes were in line with the framework of meaning of that era. With the tipping point of 1989, which can be seen as the demarcation between an 'old' and the 'new' level of stability, the context (on all dimensions) changed radically. Since then, changes of the peri-urban area stood in token of restoring the dynamic equilibrium with its 'new' context. Although it seems that this stage has not been reached yet, several elements of this new level of stability can be recognised, see section 4.7. Similar to the model of transition, Warsaw's peri-urban area has developed in a non-linear way: phases of relative stability are interchanged with relatively dynamic phases. In the subsequent subsection, drivers underlying the stable and dynamic phases are further analysed.

In the next subsection, we compare the transition phases with the phases of development of Warsaw's peri-urban area and push and pull factors, revealing the underlying mechanisms of change. In the previous subsection, the two levels of stability of the transition model have been paralleled with the communist and post-communist era. Drivers of change in line with such a contextual level of stability, towards a dynamic equilibrium, we call pull factors. Drivers of change destabilising such a dynamic equilibrium, we call push factors. Pull factors during the 'old' framework of meaning therefore have different implications than pulls factor during the 'new' framework of meaning. Below, the push and pull factors of the case study analysis are distinguished, structured by the development phases, and modelled in Figure 6.1.

During the communist period, governmental drivers remained largely the same. In terms of the transition model: the government exerted a strong induced pull towards a spatial development in line with (creating) a heavy industrial society. The first years after the war push factors were virtually absent, as most autonomous drivers were in line with the induced changes. Since the economic basis was almost completely destroyed during the War, people and government were jointly striving for filling up the economic void. With pull factors dominating in the reconstruction phase (A), the peri-urban area was quickly shaped, functionally serving the heavy industry. A relatively stable phase followed (B). Industrialisation of the region was strengthened through governmental subsidies of heavy industries. With the Iron Curtain shielding off most Western influences, and because of the absence of a market economy, suppressing most autonomous changes, push factors were relatively small. Nevertheless, in the 1970s, several autonomous developments were visible in the city of Warsaw, such as a modest rise in car ownership, the construction of single family houses, and spontaneous deindustrialisation and privatisation. These developments, in the take-off phase (C), can be seen as push factors, destabilising the dynamic equilibrium of the system. Governmental actions however, such as subsidies and legislation, kept stimulating industries until the late 1980s, which can be seen as a strong pull factor restoring the balance, in line

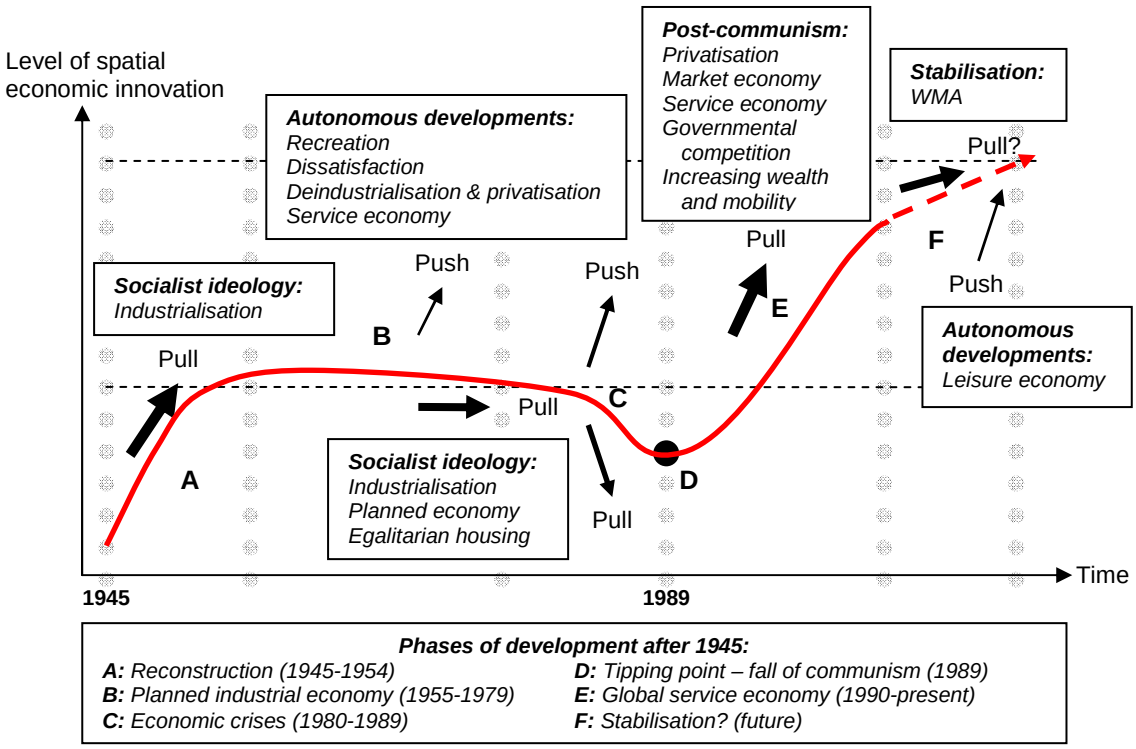
with the ‘old’ level of stability. However, this also increased the regional dependency on a mono-economy. When this economy started to decline, the entire region declined as well, visualised with a downward line in Figure 6.1. This situation shows similarities with a lock-in.

The opposing push and pull factors in phase C created a tension rather than increasing peri-urban dynamics, mainly due to rigid institutional factors. The tipping point (D) brought a release of the tension; communist institutions were broken down and a new institutional context was built up: from the ‘old’ to the ‘new’ level of stability. The majority of governmental actions was characterised by the support of the new global service economy. As a result, governmental pull factors merged with the existing push factors, resulting in an acceleration of third sector developments (phase E). More precisely, push factors became pull factors, as they were no longer detaching the peri-urban area from the ‘old’ context (which was history), instead they were working in line with the ‘new’ context. Governmental actions in the 1990s and 2000s are largely determined by municipal competition, resulting in a great tolerance for all kinds of economic developments in an institutionally fragmented peri-urban area. Autonomous, economic driven, changes dominated peri-urban developments in the acceleration phase (E) as a result.

The post-communist acceleration in spatial-economic developments is generally seen as an indicator of increasing progress and wealth. Warsaw’s peri-urban area seems to have rather quickly shaped itself to the contemporary needs of the global service economy – of course with several ‘childhood diseases’ and a rather extensive legacy of the communist era. More recently, however, an increasing share of the population perceives the negative consequences of a lack in coherence between developments. Currently, several municipalities is on the verge of creating a regional governmental layer, the Warsaw Metropolitan Area, which could lead into an increased coordination of municipal actions. This could herald a stabilisation phase (F), which could, among other things, increase the balance between public and private actions. This can be seen as a pull towards regional integration. Ultimately, this could lead to more coherent and robust regional spatial structures.

The above mentioned phases and push and pull factors have been visualised in Figure 6.1. The x-axis indicates the time. The y-axis is the progress indicator, spatial-economic innovation. This indicator has been chosen as a result of the dominance of economic drivers in the peri-urban area. However, a few remarks on modelling the peri-urban developments are necessary. Using a single line to represent the complex interplay of co-evolutionary processes seems impossible. The peri-urban area is a pluriform entity, with multiple dimensions. Using spatial-economic innovation as a progress indicator might not do justice to this multidimensionality. Nevertheless, the observed dominance of economic drivers of change seems to justify ‘spatial-economic innovation’ as an indicator of progress of the peri-urban area. Another important constraint is that the chosen progress indicator is hardly quantifiable. For instance, the ratio of workforce or GNP generated by a certain economic sector does not reflect spatial implications. Moreover, the spatial implications of a certain economic sector depend on other contextual factors, such as legislation, cultural aspects, regional history and spatial characteristics. Furthermore, local, regional and even national features will cause macro economic trends to manifest in a unique way in different agglomerations. Nevertheless, similarities maybe found. This would be of interest for the spatial planner and is discussed in the next chapter.

Figure 6.1: The transition line of Warsaw's peri-urban area, with the push and pull factors indicated. The thickness of an arrow indicates the influence of the force it represents



6.4. Concluding remarks

In general, we can conclude that the development of Warsaw's peri-urban area has been non-linear. The changes also resemble that of a transition, although the curve representing the peri-urban development (Figure 6.1) is not an 'ideal' S-curve of the transition model. The most striking difference, other than phase A which can be seen as the acceleration phase of a previous transition, can be found in phase C: the take-off phase. Although interrelated change starts to reinforce each other in this phase, the progression of the peri-urban area seems to be negative due to the excessive focus on heavy industries and the blocked market economic drivers of innovation. A similar period of decline early in the transition, although on a smaller scale, can be found in the Montpellier region (Rauws, 2009). This might contribute to a revision of the transition model as shown in Figure 2.4. However, since it is unlikely that transitions in social systems occur exactly according to a model, it is more interesting to explain the differences between the 'ideal' transition model and the observed one. According to Holling (2004) it is common that institutions and actors in a system try to hold on to a known, stable level, unintentionally reducing the adaptive capacity of that very system. The communist rigidity in this case was rather extreme. As can be seen in Figure 6.1, push and pull factors were contradicting, whereas in the 'ideal' model of transition a more flexible attitude of the government is assumed. For planners insight in mechanisms of such a decline period could improve the possibilities to avoid such a decline. A suggestion is made in the next chapter**.**

Another question that rises is whether the knowledge of a past or ongoing transition can be used to guide future transitions. The current transition, which is characterised with substitution processes of the 2nd economy by the 3rd economy, certainly provides certain general insights how to deal with transitional complex adaptive systems,

and perhaps equally important, how not to deal with them. However, it must be acknowledged that every transition is unique. The acknowledgement and recognition of autonomous developments seems crucial in avoiding or minimising regional decline. What seems to be another important lesson, since macro trends seem to be of extensive influence, is learning from other regions. Especially of those which have already experienced an adaptation to macro trends expected to influence the Warsaw region in due time. Within the PLUREL research project, the Montpellier (Rauws, 2009) and the The Hague (Hartman, 2009) region for instance might be of interest, concerning the leisure economy, which also seems to gradually develop in the Warsaw region.

The multilayered perspective has proven to be useful in unravelling the dynamics of a complex adaptive system, such as the peri-urban area. However, in this study the role of the micro level has been slightly underexposed. The micro cases of chapter five are both situated south of Warsaw, rather close to each other. The diverse development in the two micro cases shows that local characteristics can be of significant influence. However, even more variation might be expected when selecting micro cases in other areas in the region, such as the interesting lake district north of Warsaw. Also the distance to the Warsaw city centre seems to be of relevance, and whether or not an area is situated in the municipality of Warsaw or not. In the next chapter the possibilities of the micro level in regional management are explored, after all, forerunners, heralding a new (economic) era, can first be found on the micro level.

A final discussion point is the legitimisation of a research of the peri-urban area. Although the peri-urban area is by far the most dynamic area of the region, the case study analysis indicates that it cannot be seen separate from the urban part of the region (neither from an (inter)national context, so far as that is concerned). Both the urban area and the peri-urban area are intrinsically related. Moreover, the size, shape and location of the peri-urban area change in time, creating definition and research difficulties. Since the peri-urban dynamics seem to be a rather direct result of both urban and rural changes, focussing on the rural urban region or the functional urban region as a whole can be of additional value. This would suggest not to see the peri-urban area as a system on its own, but more as a (dynamic) part of a larger system; the rural-urban region. Furthermore, in the reconstruction period Warsaw was largely destroyed, resulting in a sort of ‘peri-urban inner city’. Also the demographic process of inner city decline could ultimately result in urban areas sensitive for functional change, with new opportunities for agricultural functions for example (see McMillan, 2008; De Smet, 2009). In this research, the urban developments have been analysed rather extensively, although they were seen as contextual.

In this chapter the case study analysis has been compared with the theoretical framework. In this chapter the case study results of the Warsaw region have been compared with the theoretical model. Warsaw’s peri-urban area resembles characteristics of complex adaptive systems. Moreover, the structural, multi-dimensional changes of the peri-urban area, and of the rural-urban region as a whole, could be seen as a transition. The process of change in Warsaw’s peri-urban area was largely the result of autonomous processes. The main drivers of change seem to be macro-economic trends. Based on the case study analysis, spatial-economic innovation has been used as a progress indicator of the peri-urban area. Several issues have been raised in this chapter, which will be dealt with in the final chapter.

Chapter 7: Recommendations

Marc Beeftink

7.1. Introduction

In this final chapter of this explorative research, several recommendations are made based upon the synthesis and conclusion. First, several suggestions for future research are presented in the following section. Next, possible implications of the transitional (non-linear) way of thinking for planners are explored. This chapter is closed down with several final remarks.

7.2. Further research

Transitions

The previous chapter made clear that the non-linear perspective and the model of transition have provided us with an alternative understanding of the changes in Warsaw's peri-urban area. By distinguishing different dimensions and layers, several drivers of change could be identified. Furthermore, to better understand the different phases of a transition, drivers of change have been categorised in push and pull factors, with regard to the 'level of stability' or framework of understanding of that time. Although this provides further insight in the mechanisms behind a transition, the distinction between push and pull is time-related which might make it confusing. In our case, push factors away from the 'old' level of stability, such as the process of deindustrialisation, turned into pull factors towards the 'new' level of stability. This moment was marked by the tipping point, which was a rather clear-cut moment in time. It is more difficult to distinguish the moment where push transforms into pull in the case of Haaglanden for example. Although Hartman (2009) identifies a transition in the peri-urban area, a tipping point could not be identified since changes occurred more gradually.

In the case of Warsaw, the tipping point occurred at a macro (international) level, substantially influencing the meso and micro levels. In Montpellier, the tipping point was the result of national and regional changes (Rauws, 2009). The momentum which was gained after the tipping point was rather impressive, especially in the case of Warsaw. This raises the question whether tipping points can be induced, perhaps on a regional or local scale, in order to stimulate certain developments. Future research could aim at better understanding the notion 'tipping point', its underlying drivers ('gaining critical mass'), and its possibilities for planning.

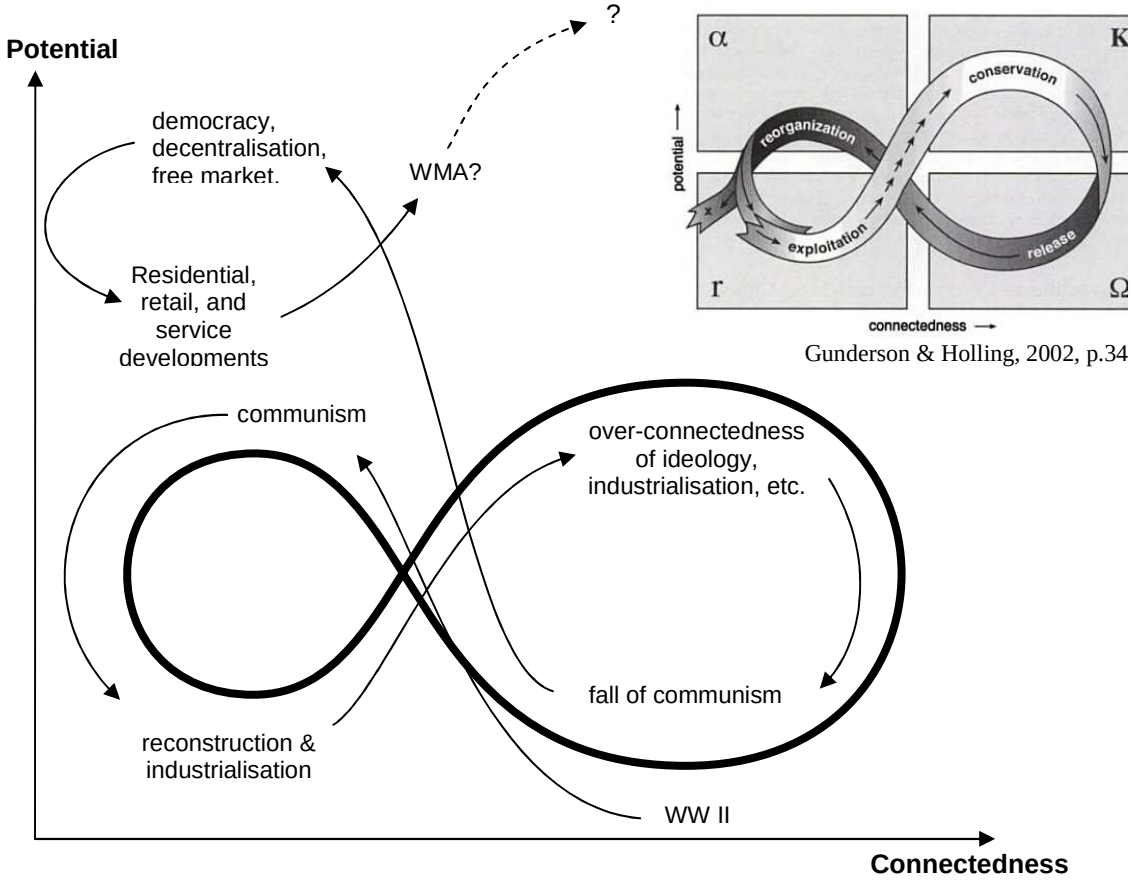
A final issue deserving further attention in future research is the role and understanding of autonomous processes in transitions. The case study analysis indicates that the transition of the peri-urban area seems to be largely the result of autonomous processes. Even when most autonomous processes were suppressed during communism, autonomous adaptive processes took place, heralding a transition. Due to the rather modest public interference with spatial processes after 1990, the majority of the changes took place autonomously. Hence, the transition of Warsaw's peri-urban area was primarily driven by autonomous changes. For the planner it seems vital to enhance the insight into these processes. Moreover, it might need for a fundamental change in the attitude of the planner: instead of *leading* change, either through a technical or through a communicative approach, *improving the adaptive capacity* and *resilience* of regions. This line of reasoning is further elaborated on in section 7.3. First, some modifications of the panarchy model are suggested.

Panarchy

In section 2.5, we have introduced the panarchy cycle as an alternative model of fundamental, non-linear change. The main question here is: how can the model of panarchy enhance our understanding of non-linear change? First, the model of panarchy is adjusted to better represent the developments in our case study. Next, two issues are raised, which might be of use to improve our understanding of non-linear change.

A fundamental comment on the model, already brought up in section 2.5, is the cyclical character of panarchy, as if indicating an endless repetition of developments through time. However, when testing the panarchy cycle using the case study analysis, it becomes clear that during similar phases of the cycle significant differences can be found. Figure 7.1 shows an adjustment of the panarchy cycle, in which it becomes clear that after the fall of communism Warsaw's peri-urban area manifests a different level of organisation and innovation than after WWII, while being in the same phase of the panarchy model. Therefore, instead of a 'closed cycle', a more 'spiralling cycle' is proposed in Figure 7.1. This spiralling cycle indicates a number of repetitive phases, while including the possibility of reaching different levels of organisation. Hence, the (semi-)cyclical character of panarchy still implies that a system inevitably becomes over-connected and loses its adaptive capacity or resilience, which would restrain that the system passes through the cycle again, comparable to the bifurcation model (see Figure 2.7 and section 2.5).

Figure 7.1: The modified 'spiralling cycle' of panarchy, applied on the developments in Warsaw's peri-urban area after World War II. The upper right corner shows the original model

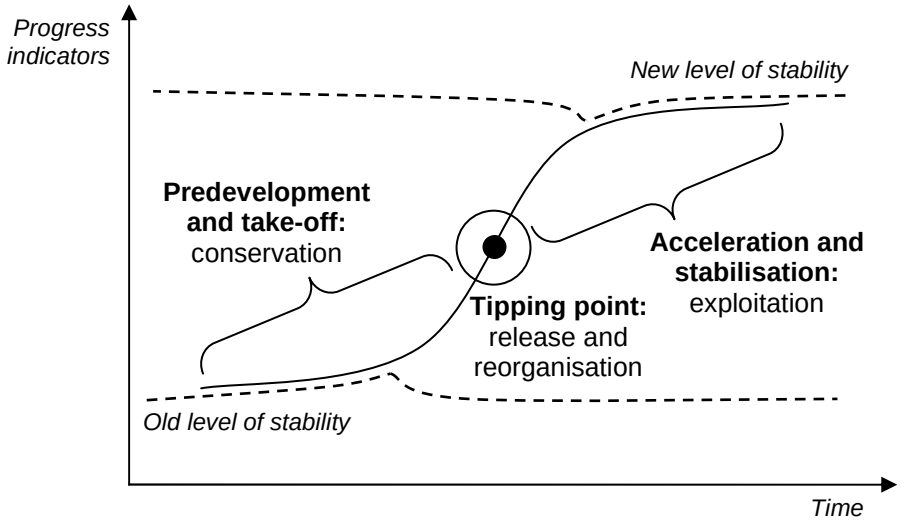


Gunderson & Holling, 2002, p.34

Now that the model of panarchy is seems to better reflect our case study analysis findings, we can turn to the elements of panarchy which might enhance our understanding of non-linearity. First, the notion 'over-connectedness' (comparable to lock-in) seems to enhance our understanding of the situation of Warsaw's peri-urban area during the last decades of communism. Although a regional (economic) decline is usually a proper breeding ground for novelty and innovation (Allison & Hobbs, 2004), it could be argued that this was hampered by the regional over-connectedness or lock-in. In this case, the ideology driven governmental (including the planner's) actions significantly contributed to this. From this could be extracted that preventing over-connectedness or lock-in could be one of the planner's new tasks. Several suggestions are made in section 7.3.

In section 2.5 and Figure 2.6 the phases of the model of transition and panarchy have been compared. However, after the application of both models on the case study analysis, rethinking the comparison might be necessary. In Figure 7.2, an alternative is proposed and explained below. In the model of panarchy, a disturbance of the system leads to a quick phase of creative destruction (release) and reorganisation (Gunderson & Holling, 2002). This could be compared with the tipping point in our case study: the fall of communism (a disturbance) leads to creative destruction of organisational, institutional and even functional dimensions, followed by the installation of capitalism (reorganisation of organisational and institutional dimensions). The reorganisation is followed by the exploitation phase, in our case the quick adaptation of the functional dimension to the new organisational and institutional context. This was characterised by a rather high economic growth and spatial change in the peri-urban area (acceleration phase). According to the panarchy model, this phase will gradually fade into the conservation phase, accumulating knowledge and resources, ultimately leading to internal over-connectedness. The smooth changeover from the exploitation to the conservation phase can be recognised in Warsaw's peri-urban area during communism. Although changes in dynamics and underlying drivers can be distinguished between the early and late years of communism, these phases are all situated in the same 'level of stability' (framework of understanding). Changes between these two tipping points appear to be linear, while in fact they might be part of two successive transitions.

Figure 7.2: An enhanced comparison between the panarchy and the transition model



In short, the model of panarchy might provide us with some useful additions for our understanding of transitions:

(1) We tend to conceptualise developments linear, especially from tipping point to tipping point, probably because developments within such time-frames can be understood in the same worldview (framework of understanding).
(2) While the transition model seems to indicate the take-off phase as a positive phase, the panarchy model indicates the opposite: over-connectedness leads to a decline of the system which is a negative driver for change, ultimately leading to a tipping point (release) after a disturbance of the system.
(3) The tipping point could be divided into two elements: breakdown of old structures and reorganisation of new structures.

To conclude, the model of panarchy does have the potential to enhance our understanding of non-linear dynamics. Moreover, the model of panarchy and transition could be seen as complementary to each other: they both enhance our understanding of non-linear change in the peri-urban area, accentuating different aspects. However, since the focus of this study lies upon the model of transition, the possibilities of panarchy for understanding non-linear change are not fully explored. Therefore, we recommend to further explore the possibilities of panarchy in relation to non-linear spatial change and planning in future research.

7.3. Possible implications for the planner

This section will explore several possible implications of the non-linear, transitional perspective for planning. Subjects, such as autonomous adaptive processes, macro trends, and resilience have been touched upon in the previous chapter and earlier this chapter. These elements are seen as essential for the planner of tomorrow.

Balancing flexibility and robustness

Earlier, the conclusion has been drawn that in general regions have the ability to adapt to a changing context. However, in the case of Warsaw's peri-urban area a rather extensive period of decline was involved. Therefore, the suggestion was made that instead of *leading change*, planners could focus on improving the *adaptive capacity* and increasing the *resilience* of regions. 'Resilience is a property of a system [...] to absorb shocks, while maintaining function' (Leuteritz & Ekbia, 2007, p.1). Balancing the robustness and flexibility of the complex system might improve the resilience and adaptive capacity, as is argued below.

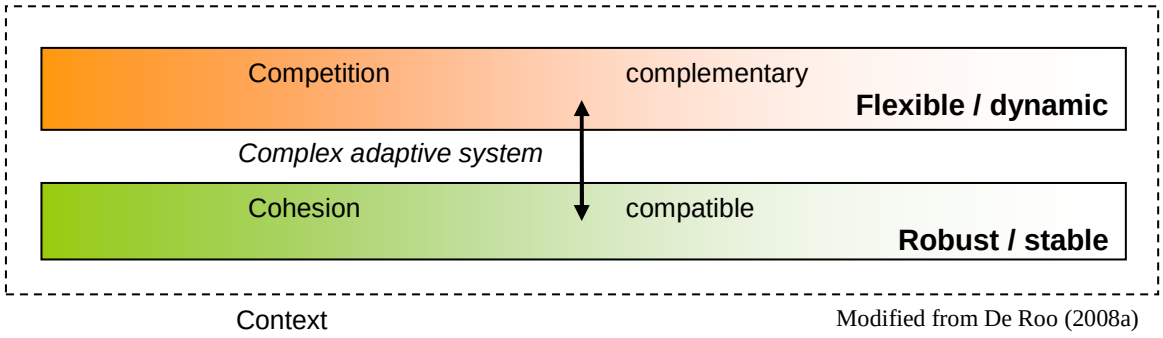
An important element of resilience is the flexibility of the system, also called latitude – 'the maximum that a system can be changed before it loses its ability to recover' (Leuteritz & Ekbia, 2007, p. 2). It has become clear that regions need to maintain a minimum level of variety in order to avoid lock-in or over-connectedness to occur. A lock-in situation would implicate that the system's flexibility, or latitude, is reduced to an insufficient level. Consequently, the system is unable to deal with contextual changes. This stresses the importance of economic competition, which leads to diversity and innovation, although competition does not necessarily lead to the highest societal return (Rietveld, 2002). Moreover, even under market conditions regional lock-in can occur (Allison & Hobbs, 2004; Boschma & Lambooy, 1999; Grabher, 1993). Therefore it is important to safeguard regional spatial-economic complementarity – the degree in which spatial-economic functions in the region replenish each other. With a high level of complementarity, the opportunities to avoid a lock-in situation seem realistic. More concrete, stimulating new, innovative economic sectors seems vital to remain a diverse, pluri-potent economic region. Obtaining regional spatial-economic diversity, utilising local characteristic, seems

indispensable for the resilience of a region. Flexibility, through competition and complementarity, was largely absent during communism, which seems to have contributed to the decline in the 1970s and 1980s.

The variation necessary for flexibility of a system needs to be balanced with robust elements of the system. Robustness is, similar to resilience, the ability of a system to maintain functioning when subjected to unpredictable perturbations (Anderies *et al*., 2004). It can also be seen as the resistance a system can offer to unbalancing forces from outside the system (Leuteritz & Ekbia, 2007). For a system to be resistant or robust, spatial cohesion and compatibility of the parts of the system seems necessary. Cohesion is the factor that holds parts of the system together and is necessary to achieve progress and sustainability (López *et al*., 2008). The level of cohesion of a region is largely determined by the mutual attraction between functions, for example economic interdependence. On the local level this can lead to clusters of related developments. Therefore, it does not necessarily contradict with the need for diversity on the regional level. Furthermore, land use functions would have to be compatible, i.e. they should form harmonious or agreeable combinations. This is a classic subject of spatial planning, e.g. separating environmentally harmful and environmentally sensitive functions.

The balance between robust and flexible elements of the system is depicted in Figure 7.3. Assuming that during a transition the balance between robust and flexible elements of the system alters more or less autonomously (see Figure 2.3), it seems that the planner's attention should change as well. During the more stable levels, maintaining the flexibility of a system will deserve some extra attention, avoiding lock-in from occurring. During the relative dynamics phases of a transition the robustness of a system might need some strengthening. A task for the planner could be distinguished: balancing a necessary robustness for stability and sustainability, and a necessary flexibility to adapt and evolve. This does not imply that the balance between robust and flexible elements of the system should not change at all, for that is one of the vital elements of a transition.

Figure 7.3: The complex adaptive system with robust and flexible elements



Modified from De Roo (2008a)

If we continue this line of reasoning, it seems that the introduction of a regional governmental layer (such as Warsaw Metropolitan Area) could be recommended. The city and its peri-urban surroundings could be considered as two elements of a rural-urban regional system, including more robust and more flexible elements. Following Rotmans (2005), managing a complex system at the meso level, would include a regional layer[24]. An

[24] Our initial presumption was to regard the peri-urban area as a system on its own. However, since the city and its peri-urban surroundings are so closely related, it would be more practical to cover them with one regional organisation. This touches upon the final discussion point of the previous chapter, the legitimisation of a peri-urban research.

interdisciplinary governance approach would reflect the multi-dimensionality of the changes in the region. Acknowledging and better understanding the complex interplay of largely autonomous macro trends with processes on the meso and micro level could form a legitimisation of induced changes. These could be used to stimulate the regional robustness or flexibility.

Planning is seen as part of the society (see Figure 2.8), therefore planning institutions, organisation and planning products can be seen as part of the balance between robust and flexible elements. Since a system in transition is fundamentally changing its characteristics, the planning system would have to change alongside, or co-evolve as Rotmans *et al*. (2001) name it. This calls for flexible planning institutions. However, as mentioned before, robustness in the planning system is also vital, for instance with respect to legal certainty. Hence, the planner is challenged to balance on the edge of order and chaos.

Searching for certainty

When a complex adaptive system is in a state of a dynamic equilibrium, change and development (morphostasis) have a relatively high level of predictability. A complex adaptive system in transition (morphogenesis), on the other hand, are characterised by high levels of uncertainty and unpredictability. Long-term projections of the future might be worthless, since in turbulent times with high dynamics, the progression of the system can be fundamentally unpredictable (see for example Holling, 2004; Kemp & Rotmans, 2005; Rammel *et al.*, 2007; Valle, 2000). Nevertheless, with aid of the transition model, some probabilities could be distinguished.

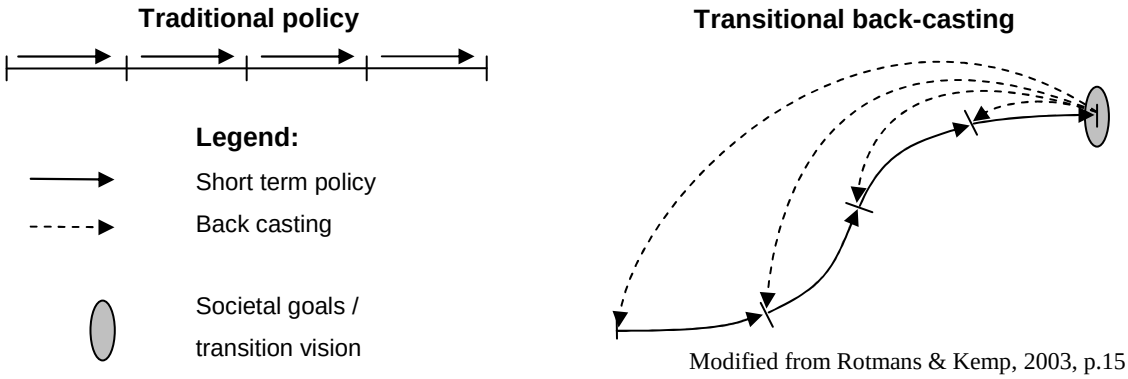
As mentioned earlier, macro trends may give the planner a hunch of where a transition leads to. Global economic trends seem to be a prominent contextual influence. Since these trends are influential on many rural-urban regions, developments in forerunning regions might be used for benchmarking (Boyer, 2005), i.e. to gain insight in mechanisms and outcomes of the global economic trends. Furthermore, local forerunners of adaptation to a changing context may be found in the own region, on the micro level (Loorbach & Rotmans, 2006). Trend watching and connecting global (macro) with local (micro) scales is vital to better understand the possible direction(s) of a transition at hand.

Another way to search for certainty is by creating common future visions, which tend to have a self-fulfilling prophecy (Mitchell, 2002). When using the transition model as a basis for such visions, two obvious questions remain: what should a transition goal exist of and by whom should it be created? Starting with the ‘who’ question, Rotmans (2005) and Loorbach & Rotmans (2006) argue that transition goals should be created in cooperation with forerunners from various networks: public, private and knowledge institutes. The composition of the group reflects the multi-dimensional change which is involved with transitions. This also implies that the spatial planner is ‘just’ one of the experts participating in the envisioning process. Continuing the ‘steering on the system level’ reasoning, it could be argued that the envisioning process should be guided by a regional governmental entity. Furthermore, Rotmans (2005) and Loorbach & Rotmans (2006) advocate a rather long-term perspective (one or two generations).

The content of a transition vision needs a high level of abstraction and flexibility, since the outcome of a transition is highly uncertain. A transition vision should reflect social goals and not just technological goals for instance. It can therefore exist out of several possible (desirable) new dynamic equilibriums – or a 'basket of images'. Nevertheless, a transition vision should be inspiring and can be useful for mobilising actors. During a transition, the goals and projected pathways can be adjusted (Loorbach & Rotmans, 2006; Rotmans & Kemp, 2003). It is argued that also during periods of relative stability it can be of value to pursue transition goals, as they are a driver of progress and innovation. Furthermore, sudden contextual shifts can require quick and fundamental institutional and organisational changes. The turbulent history of the Warsaw region reveals that sudden thorough contextual shifts are a reality. The emphasis on, for instance institutional, flexibility of transition management, makes it rather appropriate to deal with such sudden changes. Moreover, actively searching for forerunners of a transition could automatically increase the organisation's readiness for change.

Once a 'basket of transition goals' has been created, short-term policy can be placed in line with the long-term transition framework. The daily practice of policymaking will not differ that much from traditional policymaking, with the premise that it should be compatible with the long-term transitional objective (Loorbach & Rotmans, 2006; Kemp & Rotmans, 2005; Rotmans *et al*., 2000). This type of policy making is called back-casting. In Figure 7.4 traditional policy and transitional back-casting are depicted.

Figure 7.4: Traditional policy making versus transitional 'back-casting'



Modified from Rotmans & Kemp, 2003, p.15

In order to be able to implement transition management and transitional back-casting for regional development, a considerable amount of knowledge and the commitment of a wide range of actors seem necessary. Furthermore, when making long-term transition goals, there is the risk that transition goals are intentionally kept vague, in order to easily fit in short term policies. Nevertheless, thinking in terms of back-casting and transitions, as advocated by, among other, Rotmans, might provide interesting advantages for the planner. It therefore deserves our devoted attention in future research.

Concluding, dealing with non-linear change includes preparing for and actively searching for possible transitions. Trend watching, stimulating local innovations, and interdisciplinary deliberation with forerunners are key factors for the management of complex adaptive systems. Since the transition goals are created by both

public and private organisations, transition management is more a governance than a governmental approach. In the case of Warsaw, public-private cooperation has been and still is rather problematic due to its communist history. Moreover, regional governmental policy is characterised by territorial and sectoral fragmentation. Transition management requires public-public partnerships, public-private partnerships and sectoral integration for the creation of a long-term transitional framework in which organisations can determine their own agenda. The spatial planner could play a vital role in guiding the ongoing transition in the Warsaw region. Additional attention could be paid to enhancing the robustness of the region. Enhancing coherent regional structures and compatible local spatial-economic combinations seems to be the current challenge. One of the hampering institutional factors might be the current legislation with too much emphasis on flexibility (especially competition) and too little on robustness (coherence).

7.4. Final remarks

In this study we have considered Warsaw's peri-urban area as a complex adaptive system. Using this point of view enabled us to regard processes of change non-linear, which, according to us, enhanced our understanding of peri-urban developments. Phasing of developments in time, as well as unravelling developments with help of the multi-layered perspective turned out to be very insightful. Consequently, one of the lessons learned is the importance of a multi sector approach, where attention for developments related to economy, demography, and mobility deserve attention.

An even more important aspect of the non-linear perspective is the letting go of particular certainties. Despite our enhanced understanding of developments in Warsaw's peri-urban area, certain processes seem relatively intangible and unpredictable. However, as we have seen in our case study, people – and with that organisations and institutions – tend to hold on to a known and understandable conceptualisation of reality. Changes, conflicting with such a 'world view' are intentionally or unintentionally impeded by agents trying to hold on to a known system. The example of holding on to the industrial economy of the communist regime during the 1970s and 1980s might be a rather extreme; however its extremeness makes it all the more illustrative. Consequently, the perception of reality is relatively rigid and linear, until an ongoing transition becomes apparent for the majority during the tipping point, knocking over a suddenly outdated world view, replacing it by a new one. It could even be argued that holding on to a (linear) conceptualisation of a system during relatively stable periods increases the intermittent development of such systems. Although not recognized, non-linear developments do seem to happen during relatively stable periods, although a bit more under the surface.

To better legitimise spatial interventions, it seems that we, as planners, could use an improved understanding of the non-linear, complex world we plan in. This includes, *inter alia*, that systems in general continuously adapt to changing circumstances, including the planner's spatial interventions and policies. This could implicate that the planner could focus on enhancing the system's resilience, rather than leading adaptive changes of the system itself. A healthy balance between flexibility and robustness of the system seems to be crucial. Furthermore, early recognition of macro trends which might influence the region at hand could increase the planner's possibilities to reduce negative consequences of a coming transition.

Macro-economic changes seem to be an influential driver of spatial changes and therefore deserve our devoted attention. In our case study, the transformation of the industrial economy into a service oriented economy, directly and indirectly caused significant changes in the peri-urban area. Currently, even the leisure economy seems to arise in the Warsaw region, which might affect land use patterns and relations in the near future. However, also non-economic macro trends could influence spatial changes in the region. Examples are climate change, peak oil, an ageing society, and population shrinkage. These developments could contribute to another transition, including different behavioural patterns and (a need for) spatial patterns. This will bring about new challenges, calling for coherent regional transition visions, which might form a non-linear bridge between the now and the future.

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Appendix A: Philosophical foundation

By proposing the concept of transition in chapter two, spatial processes are considered as class IV, non-linear adaptive systems. These complex systems are characterised by co-evolution, path dependency and emergence. In this appendix post-positivism and critical theory will be introduced and explained as relevant philosophical background for complex adaptive systems, although complexity theory may be considered as a philosophical stream by itself. A fundamental question raised in the philosophical debate is: 'what is knowledge?' (Beaumont, 2006). This question will be addressed in the rest of this section, introducing several philosophical points of view.

Philosophical streams can have different epistemological and ontological foundations. For a long time sociological naturalism, or in short naturalism, has been a popular stream in sociology. Naturalism is a philosophical perspective that considers the physical world and the social world as roughly identical, governed by similar principles and that therefore 'research in the social sciences is essentially the same as that in the natural sciences' (Flowerdew & Martin, 1997, p.15). However, in more recent (post-modern) sociology, naturalism has been replaced by anti-naturalism, as most sociologists agree that the social world, based on human actions, differs from the natural world, governed by laws of physics. Phillips (1987, p.105) explains what the practical consequences are: 'The underlying point in all this is that the physical sciences, with their emphasis to uncover the causes that produce effect are not a relevant model for the social sciences for a simple reason: people act because they are swayed by reasons, or because they decide to follow rules, not because their actions are causally determined by forces'.

Naturalism is closely connected to positivism (a strong representative of thoughts within modernism). With positivism, scientists state that the only authentic knowledge is scientific knowledge, and that such knowledge can only come from positive affirmation of theories through strict scientific methods, for example used in physics. The aim of the positivist is 'the discovery of a set of general methodological rules or forms of inference which would be the same in all sciences, natural and social' (Bohman, 1991, p.16-7 in Allmendinger, 2002). An important foundation of naturalism and positivism is the belief in the existence of facts and direct causality, which can be discovered through careful, scientific observations. However, as pointed out in chapter two, peri-urban areas are considered as complex systems where a combination of (autonomous) drivers results to a multilevel and multidimensional change. Within these processes direct causality can hardly be found and it is uncertainty that has to be dealt with.

In the second half of the 20th century, scientists started to pay more attention to uncertainty and interaction. According to Allmendinger (2002) this is because of two reasons. Firstly, the failure of technocratic approaches on problems, scientists are expected to tackle. Secondly, the acknowledgment of social and historical background is relevant for theories that attempt to improve the understanding of reality. The context in which a theory is embedded has become an issue. Scientists have started to believe that knowledge and facts are subject to doubts and discussions, especially in social sciences, and that there is no objective knowledge.

As result, a new opposing view emerged in the 1980s and 1990s: post-modernism. Opposite to the reduced approach in modernism, post-modern scientists are eager to look at the context of the case they are examine. According to post-modernists every situation is a unique case and, more importantly, that 'no theory, particular aspect of society or 'voice' is privileged over others' (Flowerdew & Martin, 1997 p.28). The fundamental idea is that individuals should not be limited by a common mind frame. In this view, facts are fluid and elusive. Consequently, any form of consensus is not conceivable and therefore a common vision for the future cannot be created. Due to this believe management is not possible (Allmendinger, 2002).

The importance of unique characteristics of a case, emphasized by the post-modernist, is recognised in this study; the concept of transition considered in chapter two is assumed to be strongly a case related process. However, consensus and collaboration are presumed to be essential for development. To encourage collaboration, despite the acknowledgement of the claim that every situation is unique, common future visions should not be abandoned. Also within the concept of transition, the creation of a common future vision is acknowledged as a process that provides directions for developments in society. Moreover, one of the aims of this study is to identify general characteristics of transitions in peri-urban areas. Although the case related context is being acknowledged in this study, this would be contradictory to the post-modern philosophy.

By discussing positivism (or modernism) and post-modernism two extreme claims on how to understand reality are explained. The former is based on a strong believe in knowable facts and direct causality, the latter is based on a strong believe in unique individual observations, and therefore a strong disbelieve in the objective existence of facts. Related to this, a spectrum of approaches within spatial planning marked out by blueprint planning on modernist side and collaborative planning on the post-modernist side can be distinguished. However, this spectrum of approaches is considered to be insufficient to deal with complex relationships such as the peri-urban. Therefore, this study is based on complexity theory. The perspective provided by complexity theory could be explained by using the spectrum between modernism and post-modernism In complexity (system) theory it is believed that also in non-linear evolution structures can be discovered at a higher level of abstraction, while at the same time the importance of the context, subjectivity and uncertainty are acknowledged. Because complexity theory has not been widely accepted within spatial science as a possible philosophical concept, the more 'established' stream of post-positivism provides useful arguments for the perspective of this study.

Post-positivism is less rigid than positivism and incorporates some post-modernism assumptions. 'The post-positivist conception views planners as fallible advisors who operate like everybody else, in a complex world where there are no 'answers' only diverse and indeterminate options' (Allmendinger, 2002 p.28-9). According to Allmendinger (2002, p.36) post-positivist believe that:

- 'All theories are more or less normative, based on arguments and embedded in the social and historical context.
- The application of theory is not useful without the context. Thus,
- Theory is influenced by time and place and consequently multi-interpretational.
- Theory exists out of a 'complex iterative relationship between ideas and action'.

An essential difference between post-modernism and post-positivism is that the first does not accept any generalisation. The latter does acknowledge some generalisations, with the restriction that it has been created in a certain context. A contextual overview is necessary to be able to interpret the generalisation. This post-positivistic argument is an important assumption in this study. The attempt of Habermas to build upon modernism provides another an important enclosure by introducing inter-subjectivity.

With his communicative rationality, Habermas tries to overcome the duality between individualism and a top-down integrated common mind frame. 'Habermas accepts the existence of a complex mix of cultures and discourses though argues that there are ways in which people can 'make sense together'' (Allmendinger, 2002 p.185). While guaranteeing liberty on micro level, society as a whole needs structuring forces. Therefore, Habermas emphasises the importance of inter-subjectivity. Through an open dialog with rational arguments the post-modernist fear of domination by one single thought could be avoided (Allmendinger, 2002). 'We should shift perspective from an individualised, subject-object conception of reason, to reasoning formed within inter-subjective communication' (Habermas, in De Roo, 2007). In practice the inter-subjective concept of reason can be used to be able to do some generalisation, in a non-objective manner. Within the concept of transition perhaps the acceleration phase could be seen as a period of inter-subjective awareness of fundamental change.

To conclude this debate about philosophical claims, a combination of a post-positivist view and Habermas' communicative rationality could give a good foundation for this research. As a basis for this study, the complex systems theory is used. The urban fringe is regarded as a Class IV, complex adaptive system. Within in this line of reasoning a contextual overview and inter-subjectivity are elements essential for providing a philosophical framework. Others may argue that complexity theory could be seen as a philosophical concept itself. However, this debate is quite recent (chaos theory or complexity thinking became partly a well known theoretical perspective because of authors such as Gleick (1987) and Prigogine & Stengers (1984)). Although complexity theory provides an interesting perspective to better understand spatial development processes, it has not been accepted widely within spatial science. Therefore more 'established' streams in philosophy are considered above to build the framework in which this study is embedded.

Appendix B: Research design

The underlying philosophies, explained in Appendix A, provide a foundation for the research design. The peri-urban area is considered as a multifunctional interrelated area. The study presented in this report uses a case study approach to get insight in the peri-urban area, regarded as a complex adaptive system. A case study is an intensive approach to one specific case or a few cases. The primary aim is to understand processes and relations within the case study region and with its context. Secondary, conclusions are drawn regarding fundamental change of peri-urban areas in general, with the restriction that developments are context related. 'A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident' (Yin, 2003, p.13).

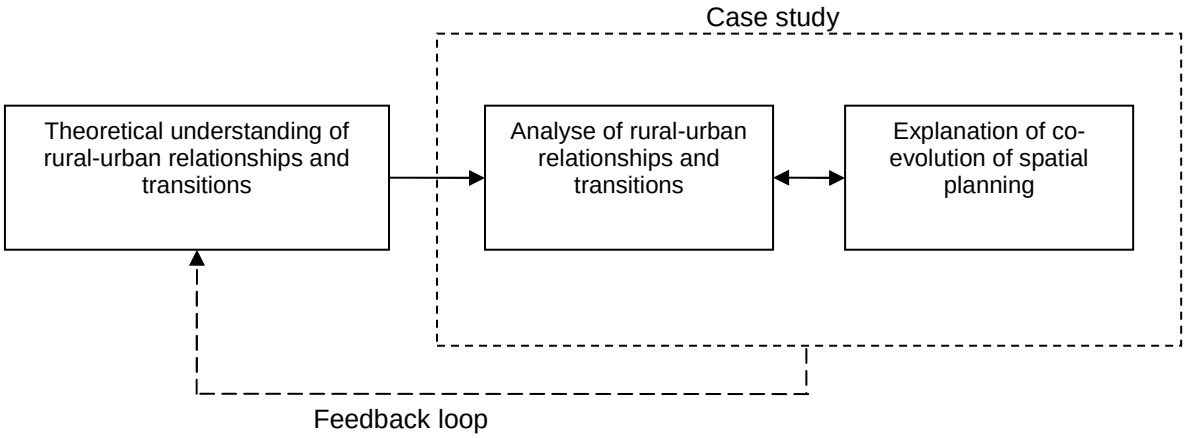
The way the research question is formulated contains assumptions that tend towards certain methods (Flowerdew & Martin, 2005). The research question of this study is: 'How to use the concept of transition to understand fundamental rural-urban relationship changes and what would be possible consequences for spatial planning?' This question reveals that no univocal link is expected and that the context is expected to be relevant. A case study approach is based on studying these links within the case and with the case and its context; therefore the method suits this research well. The case study region of Warsaw includes the three characteristics which are distinguished for an explanatory case study research by Yin (2003). First of all, the researchers have no control over the developments of the case study area. Secondly, the development of Warsaw's urban fringe is an actual phenomenon within a real-life context. Thirdly, the relation between the urban and the rural in peri-urban areas is unclear, and so is the relation between transition and peri-urban developments.

Figure B.1visualises the model for this case study based research. To get a better understanding of the notion 'transition', concepts of other disciplines such as biology, economics and business have been used. By analysing fundamental change in rural-urban relationship, the study has focused on peri-urban developments in the past. A transition arises through time and to identify whether a transition has occurred or not, a certain period of time has to be examined. Besides, often more data is available on developments in the past and interviewees are more capable of noticing major trends. In the research model a feedback loop has been included. By studying the case study areas, new insights in per-urban developments and the concept of transitions could emerge. With the possibility of using feedback, this information is incorporated in theoretical framework. The co-evolution of spatial planning will be explained in three categories; functional, organisational and institutional.

Both quantitative and qualitative methods have been used in this research, which is an approved research strategy (Baarda *et al.*, 2001). Quantitative research has been used to uncover major trends which might be indicative for transition(s) evolving in the case study regions. Data was collected from policy documents, national and region public statistics and scientific publications. To provide a better understanding of the concept of transition in the peri-urban areas and the co-evolution of spatial planning, qualitative research was used. "Qualitative research engages with the complexity of analysing human action in terms of meanings" (Ezzy, 2002, p.29). Post-positivists acknowledge the importance of these meanings, because hypotheses can be made on arguments and embedded in the social and historical context. Qualitative data has been gathered from expert

interviews, local and regional news and scientific publications. In Appendix C more information can be found of the research techniques used in this study and the internal and external validity of the study.

Figure B.1: The case study research framework



Appendix C: Research Techniques

In this appendix the internal and external validity of this study will be discussed. In the second part the research techniques will be explained.

I. Internal & external validity

Internal validity covers the probability another researcher, conducting a case study of the region of Warsaw again, would present the same results. Interviews with experts of the case study area are an important data source for this study (an overview in provided in appendix C). Although several measures to increase the objectivity are incorporated in interview process, on which an extensive explanation can be found in the second part of this appendix, a complete objective research is considered to be impossible. Both participant and interviewer influence the quality of the gathered data and the interpretation of the researcher has an impact on how the data is translated in the report (Emans, 2002). Apart from interviews also second order data sources, such as literature and statistics, are used. The advantages and disadvantages again can be found below as well. Although, also second order data similarly has constrains on the issues of objectivity, it must be mentioned that using a post-positivistic point of view excludes the possibility of objective knowledge on beforehand.

The external validity is the degree in which the observed impact applies also to other situations (Yin, 2003). The region of Warsaw is experiencing fast changes and had a clear transition period in the recent past. Also other case studies within the PLUREL project could be characterised as such, for example the region of Montpellier. However, both are unique cases, within a different culture and in a different (transition)phase of development. This makes it difficult to compare this study with a case study of other developing peri-urban areas. However, the results of this study may provide insights in backgrounds, motivations and processes in Warsaw's peri-urban area which might be valid for spatial development in other regions as well (Wester, 1991; Swanborn, 2002). Moreover, some conclusions on transition processes and transition management in general will be drawn in chapter six.

II. Research techniques

An overview is provided of the qualitative and quantitative research techniques used in the study. The techniques will be discussed on strengths and weaknesses in terms of internal validity and precision.

Interviews

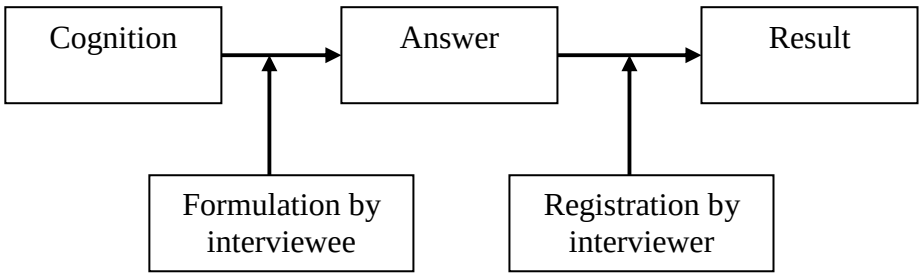
Yin (2003) gives an overview of the strengths and weaknesses of the interview method.

	Strengths	Weaknesses
Interviews	1. targeted – focuses directly on case study topic 2. insightful – provides perceive/ causal inferences	1. bias due to poorly constructed questions 2. response bias 3. reflexivity – interviewee gives what the interviews wants to hear 4. inaccuracies due to poor recall

Table C.1: Strengths and weaknesses of interviews (Yin, 2003, p.86)

In Table C.1, four weaknesses are presented. These weaknesses influence the internal validity of the research. First of all, poorly constructed questions can lead to incomplete and irrelevant answers. In this research this problem is partly overcome by a standardised question list. However, an interview is a stream of questions likely to be fluid rather than rigid. Therefore the list is only a guide (Rubin & Rubin, 1995). Secondly, response bias concerns miscommunication and misunderstanding during the interview. By repeating the important conclusions at the end of a question or discussion this problem can be partly avoided. Point three and four can be explained best by Figure C.1.

Figure C.1: The process of interviewing



Source: Emans, 2002, p. 19

It becomes evident that point tree and four could influence the precision and correctness of the interview results. By formulating an answer, the interviewee produces a translation of his own thoughts into words. The appropriateness of these translations is hard to be improved from the interviewer's perspective, except through reflexivity. By avoiding negative influence of reflexivity, the interviewer is required to stay as neutral and objective as possible during the interviews. To avoid mistakes during the registration of the interview a recorder is used and a second person made notes of the conversation. All points mentioned above explain that both researchers and participants influenced the results and therefore a completely objective study was impossible (Emans, 2002). It must be stated, however, that using a post-positivistic point of view excludes the possibility of objective knowledge beforehand. The method is, on that matter, in line with the chosen epistemology. Moreover, the advantages of this data source are seen as dominant over the disadvantages. First, the interviews were specifically focused on the case study topic. Furthermore, it provided insight in causal links, as perceived by the interviewee. On top of that there was the possibility for the interviewer to let the interviewee to clarify his point of view, if not fully understood. This is not an option when secondary source data is used. Furthermore, information gathered with the interviews functioned mainly as a framework to structure literature data gathering.

Interviews were conducted with nine experts of the case study region of Warsaw. The Warsaw region has been visited from the 8th till the 20th of April 2008. The interviews were focused on the developments in the peri-urban area of the case study regions and the adaptation of planning to these developments. Conversations have been held with representatives of public spatial planning authorities, real estate developers, scientists, and students. The participants received an indication of the question list in advance (see Appendix D).

Literature, statistics and other data

This research used secondary source data as well. Secondary source data is not generated by the researcher himself, but collected from other sources. Flowerdew & Martin give a strengths and weaknesses overview of this data source (Figure A.3).

Figure C. 2: Features of secondary data

	Strengths	Weaknesses
Secondary source data	• It already exists • It provides the researcher with contextual material for his primary research • It is usually of proven quality an reliability • A very wide range of secondary material is available	• Its inflexibility • Its quality is unverifiable since it is not replicable • Secondary data is a cultural artefact, possible produced with a different way of seeing the world.

After Flowerdew & Martin, 2005 p.58

One of the weaknesses of secondary source data is its inflexibility which means that the area covered by the collected data is not necessarily the same as the study area. This problem was overcome by conducting interviews. Information gathered by literature and interviews could be seen as complementary. Moreover, different types of secondary source data were combined to create a better overview of the developments that have occurred. Another problem is that secondary data is a cultural artefact. This has to do with validity of notions. With the use of secondary source data the researchers that accomplished the study could have had different definitions of the notions used in the research (Swanborn, 2002). Although misinterpretations of secondary source data cannot always be avoided, it is reduced due to careful interpreting and by using multiple sources of information on the same subject, including interviews. Main secondary source data sources used in this research are publications of scientists and policy documents about the history of the case study regions and the planning system. Furthermore, statistics and policy documents are used to uncover trends which might be indicative for transition(s) evolving in the case study regions.

Appendix D: Question list

Indication of the question list during the expert interviews, sent to the interviewees in advance of the interview.

A. Background information respondent
Name:
Organisation:
Relation with the subject/ function:
Time:
Place:

B. Questions

Past
How has the relation between the city of Warsaw and its hinterland evolved during the last decades?
Perception of peri-urban area
Characteristics of the peri-urban area
Role of the peri-urban area in the region

Could you explain which trends have dominated the development of the urban fringe the last decennia?
- population
- economy and employment
- land use
- environment
- mobility
- culture

What have been important projects in the development of the urban fringe of Warsaw?
- autonomous or induced developments
- private, public or PPP

Could you indicate the changing conditions that have influenced the rural-urban relationship changes?
- socio-political change
- behaviour of government, non-government, and private sectors
- particular events

Nowadays
Which areas in the urban fringe are being developed at this moment?
- autonomous or induced development
- private, public or PPP

Could you give a SWOT (strength, weakness, opportunities, threats) analyses of the development of the urban fringe?

Future
How do you see future developments?
-government
-infrastructure
-housing
-leisure
-sustainability
-current trends

Do you have any other remarks that could be useful for our research?

Appendix E: List of interviewees

The information provided by the interviewees is used confidentially. Therefore, only a description of the background of the interviewees is provided below.

Interviewee A (2008) Civil servant, interview conducted 9 April 2008, Warsaw

Interviewee B (2008) Director of non-profit organisation, university researcher and former civil servant, interview conducted 10 April 2008, Warsaw

Interviewee C (2008) University researcher, interview conducted 10 April 2008, Warsaw

Interviewee D (2008) University researcher, interview conducted 11 April 2008, Warsaw

Interviewee E (2008) Director of private real estate research company, interview conducted 11 April 2008, Warsaw

Interviewee F (2008) Researcher, interview conducted 12 April 2008, Warsaw

Interviewee G (2008) Private real estate developer, interview conducted 14 April 2008, Warsaw

Interviewee H (2008) Civil servant, interview conducted 15 April 2008, Warsaw

Interviewee I (2008) University researcher, interview conducted 1 October 2008, The Hague and contacted by e-mail