



**KTH Architecture and
the Built Environment**

**ON ANALYSING CHANGES IN
URBAN STRUCTURE
SOME THEORETICAL AND METHODOLOGICAL ISSUES**

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PREFACE

Naturally, a thesis like this is connected to the author's background and social context. Below I would like to acknowledge some of the people who have been important to the completion of this thesis. Firstly, I would like to thank my mother Ulla and my father Gunnar (in absence) for transferring their wide range of interests to me; for their interest and openness in discussing any subject with me from early age; and, finally, their openness in letting me as a young person develop my life without pressure on a specific professional career or expectation of achieving any kind of status.

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ABSTRACT

Due to social and ecological effects of urban development and the possible linkage between the spatial configuration of urban structure and people's activities there has been an increasing focus on urban form. Still, descriptions and understanding of the urban structure need further development. This thesis aims at contributing in these matters by answering following questions: To what extent does planning impact on location activities, and in the development of urban structure? How can spatial change in urban structure be quantitatively described? Could social theories help us to understand both the influence of urban structure on human behaviour, and the consequences of that relation in social, economic and ecological terms?

In order to estimate the impact of planning on location activities and changes of urban structure methods of regression analysis, density estimation, estimation of polycentric structure and change have been used. The study also employed discourse analysis using social and urban theory as reference points.

The results from this thesis reveal a strong influence of planning efforts on location activities and the change of urban structure. The combination of, as well as the development of methods, have facilitated description of change of urban structure and evaluation of it against planning guidelines. According to the wide range of perspective in understanding urban structure the social, economic and ecological consequences of these urban changes are uncertain. Still, an integration of social theory in planning might lead to a deepened understanding of the urban structure and the possibilities of planning.

The research presented here provides evidence for the importance of planning policies. Planning thus emerges as a tool for achieving certain urban structures and thereby, possibly, sustainability.

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COVERING ESSAY

1. INTRODUCTION

The ambition to plan cities and to regulate activities in space can be traced to the first civilizations. This ambition stems from a number of reasons – ranging from defence to the regulation of property rights; to various kinds of resources and religious ideation. Later economic development, like industrialization, implied a thorough spatial restructuring of society, from which poor social and environmental conditions emerged in the 1900s. In the late 1900s, a number of initiatives in urban planning were pursued to address the social, economic and environmental circumstances. The most famous of these might be Ebenezer Howard's (1898) thoughts on the Garden City and its regional extension, the Social City. The interesting intellectual shift that occurred in this development of planning might be described as a belief in the urban structure not only as a consequence of economic development, or a direct resource for industrial development, or a function of administrative purposes, but in that structure itself as a condition for social and economic development. According to this belief, a city of a certain size, spatially arranged in certain way, could develop into a relatively healthy self-sufficient socio-economic unit.

Today – for instance within the New Urbanism movement – similar thoughts on the relation between the individual and the spatial structure of a city can be observed. According to this thinking, the spatial distribution of buildings, people and firms impacts on people's activities, possibilities, life chances, individual economic development, etc. These activities naturally also have structural environmental, social and economic effects - for example, the effects on the ecosystem due to increasing emissions from transportation; the effect on the dynamics of social life within urban centres due to an increasingly segregated urban structure; or impacts on social welfare due to changed provision of collective consumption goods (see Williams et al. 2000).

Following such ideas, a number of concepts of *urban form* have developed. For instance, it has been proposed that in contrast to a dispersed urban structure, a polycentric urban structure – comprising several urban centres and green areas in-between – would imply greater accessibility to outdoor recreation, shopping, labour market, public facilities like public transportation, etc. (Champion 2001: 668-674). These ways of thinking have, during the last two decades, also been highlighted by the political system in order to achieve *sustainability*. An interest in sustainability is pronounced in national laws on land use regulation that also govern the local planning procedure. Since 1992, there has also been a formal international concern with regard to land use, based on the Agenda 21 agreement (United Nations, Department of Economic and Social Affairs, 2003). This concern is also reflected within the European Union, through the European Spatial Development (ESDP) perspective and the European Spatial Planning Observation Network (ESPON). This interest is also pronounced in the Regional Development Plan 2001 for the Stockholm region (Stockholm County Council 2002).

Knowledge about how to describe types of urban structure is therefore important for developing planning tools, measuring “progress towards sustainability” and guiding planning policies (Burton, 2002: 220). These ambitions are, however, connected to two major uncertainties. Firstly, due to the uncontrollable nature of social structures and processes, political agreements on land use (plans) possibly have limited effect on the actual configuration of the urban structure (cf. Johansen 1977: 58). Secondly, even though social theorists such as Dunlap and Catton (1979: 256) and Giddens (1984: 112) describe the effects of the built environment on social behaviour as limited though substantial, this relation is possibly also affected by other uncontrollable social and ecological circumstances. Thus the fulfilment of political ambitions concerning the urban structure and the subsequent social, economic, and ecological consequences is uncertain. These

uncertainties together generate a need for further analysis concerning how to depict urban structures.

The overall aim for this thesis is to analyse the relation between planning guidelines (political ideations) and changing urban structures. This general aim can be rendered through three specific research questions, namely:

- To what extent does planning impact on location activities, and in the development of urban structure?
- How can spatial change in urban structure be quantitatively described?
- Could social theories help us to understand both the influence of urban structure on human behaviour, and the consequences of that relation in social, economic and ecological terms?

The thesis comprises four papers. The first paper “New urban settlements in a perspective of public and private interests” (published 2008) emerged as a result of the research project “Statistical landscape analysis of spatial development regarding location of residential areas in Sweden”, financed by FORMAS. The main aim of the research project was to investigate the possible influence of planning on actual location patterns. Two distinct kinds of research interests emerged from this research - an interest in analysing the change in urban structure resulting from new locations; and an interest in developing a deeper understanding of the location activity, and the influence of urban structure on individual social behaviour.

This first interest resulted in a second approved research application – “Urban form and the polycentric scheme”, financed by FORMAS – and two papers: Papers II and III comprising tests and developments of methods for describing changes in urban polycentric structure. In both papers, changes in urban structure are analysed in relation to contemporary planning guidelines.

The second category of interest to emerge from this original research project may need further, more detailed, explanation. Whilst studying conventional theories (for instance, the work of Johan H. von Thünen, Alfred Weber, August Lösch, Walter Christaller, William Alonso, Masahisa Fujita, and Philip McCann), I found their theoretical contribution to location activity strongly influenced by rationality in minimising costs and maximising profit and utility. These theories have high explanatory value with regard to the location of business activities. However, individual reasons for residential location activity may be more complex. Within social theory, a wider range of reasons for individual activity is acknowledged. Therefore, in order to deepen my understanding of an individual’s residential location activity, I extended my interest into this theoretical field. Within a number of ‘integrative’ social theories, individual action is related to the structural properties of society. To a varying degree these ‘integrative’ social theories comprehend structures similar to what I address as the ‘urban structure’ (for a description of the concepts see section 2 below). As the second research application comprised an analysis of urban structure, it also resulted in an interest in further developing my theoretical understanding of ‘urban structure’. That is: does urban structure matter and in that case how and to what degree? To some degree, this issue has been taken up by prominent scholars like Thrift 1982, Gregory 1994 and Cuthbert 2006. This enhanced understanding is important in order to evaluate the possibilities for achieving (for instance) a sustainable society through spatial planning efforts. Basically, these studies resulted in a set of hypotheses about the influence of urban structure on individual activities *vis-à-vis* other influencing factors. Some of these findings are specifically used in Paper IV and in this covering essay. This general interest in social theory has also functioned to provide an implicit theoretical framework for Papers I to III.

In Paper IV, and in this covering essay, three integrative social theories have been selected for further explanation due to their position on the scale between determinism and free will. These are Durkheim's theory of 'social morphology', Habermas' theory of 'life world' and 'system' and Giddens' 'structuration theory'. In Paper IV, planning documents concerning the relocation of the town Kiruna are explicitly analysed through these three social theories, as well as three urban design ideals. Paper IV thereby complements Papers I to III in its provision of a wider theoretical understanding of urban structure. Paper IV is still not completed in its final shape.

This research has been carried out in the Division of Urban and Regional Studies, KTH, within the research subject 'infrastructure'. 'Infrastructure' is the covering label for comprehensive planning research which focuses on the development and management of the built environment and other urban facilities; the analysis of social and economic processes; and the relation between social processes and the urban and infrastructural system. The location activities and urban structural changes examined in Papers I to III comprise essential aspects of the development of the built-environment (see section 4 of this covering essay). Further, the research in Paper I addresses location activities in relation to urban facilities and infrastructure systems. Finally, social process theories are covered in Paper IV, and economic process theories are covered in Papers I to III (see figure 1). As such, the research presented here corresponds to the intentions of the research subject infrastructure.

The structure of the covering essay is as follows: in section 2, central concepts are defined; in section 3, a number of theoretical and methodological perspectives of changes in urban structure are presented; in section 4, the papers are summarized; in section 5, a theoretical evaluation of the urban change exposed in the papers is presented; and, finally, in section 6, a discussion comprising results, critical assessment, conclusions and suggestions for further research is presented.

2. DEFINITION OF CONCEPTS

In order to prevent confusion in the meaning of certain concepts, a number of definitions are presented here.

The concept 'built-up structure' refers to several buildings in space. Buildings and built-up structures then have attributes such as volume, form, colour, physical position, density (see Sayer 1992: 24 and Ahrentzen 2002: 98).

'Social structure' denotes a number of individuals that, in one way or another, are related (see Blau, 1977: 27, 29). This relation could be due to friendship, business relations or other linkages or mutual interests. For instance, a firm or a family comprising several people constitutes a social structure. Individuals and social structures have attributes such as age, sex, education, occupation, etc. Individuals and social structures perform activities in space.

The combination of a built-up structure and these activities is here addressed as 'the urban structure' (cf. Ahrentzen 2002: 98). The urban structure could have various distributions in space – that is, various spatial configurations. Examples of such configurations are found in 'the compact city' and 'the polycentric city'. As the social structure produces the activities that are included in the concept of 'urban structure', there is a link between these concepts. A change in the urban structure might imply either an increase or decrease of the number of buildings within it, and thereby a change in its spatial configuration - the urban structure could, for instance,

develop from a monocentric to a polycentric spatial configuration. The concept 'urban form' is occasionally used as a synonym for the spatial configuration of urban structure.

'Planning' refers to spatial planning on any scale aiming at transforming the urban structure on a local, regional or even global level (as in the planning guidelines within the Agenda 21 agreement (United Nations, Department of Economic and Social Affairs, 2003)). Depending on the context, concepts such as 'planning procedures', 'planning guidelines' and 'planning documents' are used.

The concept of 'social theory' refers to theories that aim to create concepts for understanding human behaviour in its social context, as well as relations and changes in social life (Andersen and Kaspersen 2000: x).

'Integrative social theory' refers to social theories that aim to theoretically link the individual and the structural aspects of society – or, in other words, link the micro level to the macro level and vice versa (see Ritzer 2008: 499 ff).

3. THEORETICAL AND METHODOLOGICAL PERSPECTIVES OF CHANGES IN URBAN STRUCTURE

The thesis comprises this covering essay and four papers. Allmendinger's (2002: 90-92) typology for theoretical positioning is used as a framework to position the present work. The reason for this outlining is first to facilitate understanding of the research (research questions, methods, and results) and, additionally, to prevent misconceptions resulting from different theoretical perspectives on the nature of urban structure. This theoretical positioning functions as a research discourse – "a frame for understanding" (Allmendinger 2002: 78). Without such a positioning, there is a risk of premature and highly uncertain conclusions (see Mårtensson and Nilstun 1988: 23). In accordance with this reasoning the research presented herein is theoretically positioned in relation to major planning paradigms and social theories.

3.1 PLANNING PARADIGMS

The field of urban and regional planning takes in a number of theoretical positions. Given this, how can this research be linked to theories of urban and regional planning in a general sense? Urban and regional planning might, for instance, be structured according to any number of different approaches - for instance, system planning, rational planning, communicative planning, collaborative planning, or postmodern planning. Further, a number of scholars have positioned planning theory within a more general theoretical framework - for instance, Faludi's (1973) notion of substantial and procedural planning; Fiedmann's (1987, 1996: 18-19) categorisation of social theories into four linear planning traditions: policy analysis, social learning, social reform and social mobilization; Yiftathech's (1989: 27) categorisation of social theories into three kinds of linear planning focus: analysis, form, and process; and Allmendinger's (2002: 94, 2009: 43-46) non-linear typology covering planning theory, social scientific theory, social theory, exogenous theory, and framing theory.

My impression of these typologies is that firstly, there is a lack of common agreement on a structure (or typology) of planning theories, and secondly there is a lack of agreement on the definition of the specific theoretical positions within planning theory. Possibly these issues are linked. The first issue makes it difficult to discuss urban research in relation to specific 'planning theories'.

Basically, it seems as if the classical dichotomy between rational-system and communicative planning approaches remains (cf. Allmendinger 2002: 93). The 'traditional' system-based planning approach comprises a belief in the city as a system, where a change in one part of the system affects other parts of that system. These relations could presumably be described, understood and predicted by 'scientific', and occasionally also complex, methods. Additionally, it is also assumed that this system could be optimised. If the city develops in a direction that differs from the stated goal formulation, then the system planner, operating through certain means – for instance investments in infrastructure – could steer the system back onto the right course. The communicative planning approach, on the other hand, perceives reality to be a social construction and the truth to be relational. The urban structure, urban problems, urban goals and planning means are understood to be socially defined and thus things that can only be managed through a communicative process.

As a response to these descriptions, it might be articulated that it is not a natural law that system planning is undemocratic, rejects social constructions, optimises capital accumulation and supports the dominant power system (Friedmann 1987/1996: 23). It might be the opposite. Land use proposals from a system planning perspective could be used in a democratic planning process, acknowledge other perspectives, and serve as solutions that aim at optimising various social welfare goals. Supporters of the communicative planning approach must then not only acknowledge the value of expert knowledge in (for instance) system theory, but also show how this knowledge could be anchored in the planning process (cf. Healey 1997: 246-247, 264). Assumedly, there are also misconceptions about communicative planning theory by supporters of rational-system planning theory. It might be possible to incorporate complex relations through social learning within a communicative planning process. Additionally, the communicative process could improve system planning by introducing unknown aspects and evaluations. In such a case, the supporters of the system-planning perspective must acknowledge a social constructivist approach – that the truth is always somewhat relative (see Allmendinger 2009: 77).

The collaborative planning process is based on communicative action (a life world perspective – see Habermas 1987: 120, 136). It does not – in my view (cf. Healey 1997: 246-247) – overcome the difficulties in achieving the efficiency revealed by Habermas (1975: 297). The evolutionary argument for the existence of decision making in the system world (in a Habermasian sense) is the necessity of efficiency in coordinating actions in a complex world. This efficiency is not possible to accomplish in a life world perspective and – as I understand it – not within a collaborative planning process either. Thus, a number of complex, although influencing factors, are excluded – either on purpose or unintentionally – from the collaborative planning processes. For instance, external factors such as the price of gasoline, the rent, the overall state of the market, are consequences of external uncontrollable complex processes and factors. Further, the internal relation between the built-up structure, social structure and social/individual activities might not only be unknown, but also not explicitly acknowledged and not agreed upon. Without an inclusive learning commitment, the effects of the planning process are difficult to discuss. Still, these factors have a decisive influence on central planning issues as life chances, transport costs, the configuration of urban structure, economic development, and the fulfilment of urban plans.

On the other hand, in 'traditional' system planning and rational planning there is a belief in experts, 'scientific' objective knowledge, and the optimal solution. This perspective has two main deficiencies. Firstly, all knowledge is socially dependent in one way or another. Even if objective knowledge does exist, this kind of knowledge is produced according to an available stock of knowledge in a social context. Secondly, objective knowledge is evaluated in comparison to other kinds of knowledge in a planning process. Therefore, even system planning is dependent on a social constructivist perspective.

It seems as if these two main approaches to some degree could be combined. Then the perspectives in system planning should be broadened by communication, and collaborative planning should be deepened by learning procedures incorporating the complex relations revealed by system planning procedures.

3.2 SOCIAL THEORY AND URBAN STRUCTURE

Within (at least parts of) the planning community, there is a belief that the spatial distribution of buildings, people and their activities has an influence on the action of the individual. Political goals relating to ecology, economy, and social issues have been linked to specific urban structures (see Papers I to III) and, further, this approach clearly presumes a belief in the influence of the urban structure on individual action. These issues have been the main focus within social theory since the nineteenth century. The intention in social theory is to create concepts that can be used to understand human behaviour in its social context, as well as relations and changes in social life (Andersen and Kaspersen 2000: x). Social theories could then serve as a resource for understanding the position of a given urban structure, within a given social context, in influencing human behaviour. The urban structure (and/or one of its constituents – the built-up structure) has a significant influencing position in the integrative social theories examined in Paper IV. The degree of influence varies depending on the theory. For instance, in Durkheim's theory, urban densities are perceived to be almost directly related to complexity in social relations (Durkheim 1893/2007: 171-172, 175). In Habermas' theory, the urban structure provides a set of affordances that are brought into the life world by the actors (Habermas 1987:121-123). In Giddens' structuration theory, the urban structure can be understood as an abstraction (among others) of external constraints in the form of materials, structures (patterns of activities) and sanctions (Giddens 1984: 175, 176). Thus, the spatial configuration of an urban structure is one decisive factor to examine in order to increase knowledge about a society. Below, these theories are further described.

In order to depict the possible importance of (broadly) urban structure and (specifically) the present research in a social context, the three social theories of Durkheim, Habermas and Giddens used in Paper IV are here briefly presented. The selection of theorists has been due to their position on the continuum between determinism and free will *vis-à-vis* the urban structure (Adolphson 2010; cf. Thrift 1982: 27). Each of the social theorists also emphasise certain social features as bring important in the relation between the individual and structural phenomena. Durkheim (1895/1982: 56, 57) emphasises determinism, as he sees individual action as a product of external circumstances. Habermas (1987: 120, 185, 376-377) proposes a limited individual freedom through the communicative action process. Finally, Giddens (1984: 5, 221) emphasises the reflexive individual constrained by environmental conditions.

The theories selected could be interpreted as deterministic, intermediate deterministic and non-deterministic. Durkheim, Habermas and Giddens represent not only different positions on the continuum between determinism and free will, but they also emphasise different social aspects that relate to the spatial configuration of the urban structure. The focus here is on the importance of the urban structure and how to delineate the research in Papers I to IV due to these social theories. A number of specific issues in these theories are highlighted.

Durkheim

From a Durkheimian perspective, the citizen is a product of structural – that is, supra-individual – circumstances. The basis for this approach lies in a belief in an individual dependence on the

social context with regard to language, values, behaviour, etc. Not much of our behaviour could, according to Durkheim, be explained from the perspective of ‘the individual in isolation’ (Durkheim 1895/1982: 145). This dependence is depicted through the term ‘collective consciousness’ (Durkheim 1893/2007: 162, 1895/1982: 145). If the individual is a member of a society, he/she also share this society’s ‘collective consciousness’. Thereby a societal change could not be explained due to individual circumstances, and only collective structural circumstances matter – that is ‘social facts’ (Durkheim 1895/1982: 134). Durkheim distinguish between three sets of social facts: ‘the social morphology’, ‘institutionalized norms’, and ‘social currents’ (Durkheim 1895/1982: 52, 111). The term ‘social morphology’ incorporates buildings, people, etc. and is therefore somewhat similar to my notion of urban structure. Institutionalized norms constitute laws and then also presumably urban plans. A Durkheimian perspective implies that the individual and individual activity are dependent on these social facts. A social fact can only be explained from other social facts. Therefore the society – and the urban structure – ‘lives it’s own life’ and is impossible to govern. Consequently an urban plan is a consequence of other structural circumstances – not individual initiatives.

Habermas

Habermas distinguishes between ‘actor world’, ‘objective world’, ‘life world’, and ‘system world’ (Habermas 1987: 120, 185, 376-377). The ‘actor world’ comprises the actors’ personal experiences, their social integration and their knowledge of the ‘objective world’ – the world in which true statements are possible to declare – and the system world. The ‘life world’ is a social environment where information and ideas are exchanged between actors, where a mutual understanding is formed and where possibly a communicative action process takes place (Habermas 1987: 120, 136). The life world is also the place where the culture – the common stock of knowledge – is reproduced and where identity formation takes place (Habermas 1987: 137-138). As identities are reproduced and transformed through life world processes, when and where people meet (for instance, workplaces, homes, cafes, and social platforms on internet), the urban structure – through the spatial distribution of meeting points – matters. The distribution of meetings points therefore influences the extension of life world process – the public sphere (Habermas, 1987: 185, 267, 390).

The ‘system world’ represents economic and administrative systems that extend outside the perceived world of the citizens. The existential argument for a system world lies in its capacity to coordinate actions in time and space in an efficient way (and thereby possibly also in a sustainable way). In a life world perspective, the steering capacity is dependent on mutual understanding and the communicative action process. In order to coordinate actions efficiently, the system world instead uses economic media (money) and power media (law, plans, etc) as steering tools.

Hence, from a Habermasian macro-level perspective, the urban structure is configured in order to promote an efficient coordination of actions in time and space and then to optimize capital accumulation within the economic system. This macro perspective also implies a belief in planning. It is then possible to achieve political goals by planning efforts. Also in accordance with the Habermasian perspective, these planning efforts must be anchored in the life world. This intermediate deterministic position thus implies a possibility for groups of individuals, through communicative actions and the creation of public spheres, to influence urban plans and the urban development.

Giddens

Giddens' main thesis is the idea of 'structuration'. When people perform activities, they also reproduce objects in space – the duality of structure (Giddens 1984: 19). When people shop, the shop is reproduced; when people reside, they reproduce their homes. The possibilities to accomplish activities are dependent on the configurations of constraints (both enabling and constraining) of three kinds: material (the body and the physical environment), structural (pattern of activities in space and time), and sanctions (laws, plans, etc.) (Giddens 1984: 25, 175). In the action-generating process, the individual uses his/her perception of the world (the configuration of the constraints), knowledge about how to understand these structures and about how to behave (mental structures), and evaluation of possible consequences of this action ('reflexive monitoring') (Giddens 1984: 179, 181, 213). Through the mental process of 'reflexive monitoring', the individual possesses a great deal of freedom in relation to both the internal guiding schemes (structures) and the external constraints (Giddens 1984: 5, 221). The action performed thus reproduces social systems (for instance, a shop). Through this reproduction, the individual also contributes to the creation of resources (shops, railways, recreation facilities, etc.) for other people. This reproduction is thus dependent on the physical *milieu*, among other constraints. Hence, if the intra-urban position of a shop is changed, the character of the shop will then also change. Each urban object is then dependent on its intra-urban position. A changed urban structure will imply a changed intra-urban position. In spite of the focus on reproduction, Giddens perceives societal development to be somewhat unpredictable. The reason is that individual actions result in both intended and unintended consequences. Thereby the urban structure continuously develops in an unintended way. In essence, even though Giddens acknowledges the macro level, the focus is on the micro level. Thus, the reproduction of the urban structure is strongly dependent on individual circumstances.

3.4 APPLIED METHODS

The methods used in the papers range from quantitative methods for describing location activities and changes in urban structure to discourse analysis in describing various perspectives in planning documents on the relocation of Kiruna. The quantitative methods comprise multinomial regression analysis of spatially distributed data, methods for estimating density, mixed functionality, and two methods for describing polycentric urban structures. The discourse analysis aims at analysing the theoretical position regarding environmental determinism within planning documents in connection to the relocation of Kiruna. The social theories of Durkheim, Habermas and Giddens and the urban ideals of New Urbanism, Everyday Urbanism and Post Urbanism function here act as reference points. These methods are in detail described in Paper I to IV.

4. OUTLINES OF THE PAPERS

4.1 PAPER I: NEW URBAN SETTLEMENTS FROM A PERSPECTIVE OF PUBLIC AND PRIVATE INTERESTS

This first paper examines spatial location profiles for residential and commercial building types in the municipality of Strängnäs – within the hinterland of the Stockholm City Region. Changes in land use patterns and urban structures in this area can be seen as the dynamic result of the trade-off between public and private interests. The land use change is, therefore, to some extent unpredictable. The focus in this paper is to measure the importance of spatial location factors for new residential and commercial buildings in relation to existing urban structure and political

guidelines. The paper addresses the influence of distances to other building types, urban centres, transportation nodes; and the influence of comprehensive and detailed land use plans on location choice (see Paper I, Appendix 2, and Table 7). The relative importance of the location factors was studied through multinomial regression analysis (see Paper I, equation 1). Results from this study reveal that the obtained location profiles of new urban object types indicate strong correspondence with local political land use guidelines and to clustering of similar activities - although agglomeration was not a pronounced goal in the planning documents (see Paper I, Table 3). For instance, when the distance increased from 100 meters to 800 meter from existing residential houses, the relative marginal effect regarding the probability for a location of a new residential house decreased by 130 percent. Increasing distances to public or private services did not imply any difference in the location of new residential houses. Occurrence of local political guidelines for land use increased the relative marginal effect regarding this probability by 270 percent.

The spatial distribution of new urban settlements does not, in general, correspond to a monocentric urban structure wherein firms and residents locate in spatial proximity to urban centres (see Paper I, Table 3). The location model developed in this paper will increase the understanding of changes in urban structure, thereby allowing planning methods to be refined and adapted in accordance with the increased knowledge. The correspondence between democratic decisions and spatial outcomes may therefore subsequently improve.

4.2 PAPER II: KERNEL DENSITIES AND MIXED FUNCTIONALITY IN A MULTICENTRED URBAN REGION

During the last decades, the focus within the urban form debate has shifted from the compact city towards a polycentric urban framework. The ability to define consistent urban structures and also link them with sustainability goals has, however, been hindered by inconsistent evaluation methods for density and mixed functionality in a polycentric framework. The aim of the research presented in Paper II is to test and combine various methods in order to define more reliable and consistent descriptions of urban structures. The methods used are spatial-density modelling using kernel convolution, polycentric density estimation, and methods depicting mixed functionality and the association between density and mixed functionality. The empirical findings relate to planning goals at both national and international level. The study region is the municipality of Strängnäs, within the Stockholm City Region, since 1997. The effects of new locations on the urban structure presented in Paper I are thus studied here in Paper II.

Contrary to the political ideations in the Agenda 21 agreement (1992), results from the analysis reveal an urban development moving towards further segregated land use and sprawl in the municipality of Strängnäs, as well as a decreased linkage with a polycentric urban structure (see Table 2 and 3 in Paper II). The methods developed for depicting urban structure through this paper could be useful tools in the planning process and may reinforce the possibility for analysing links between urban structure and sustainability aspects. This improved knowledge in turn could contribute towards formulating future planning principles.

4.3 PAPER III: ESTIMATING A POLYCENTRIC URBAN STRUCTURE

The aims of Paper III are to empirically test and evaluate methods for describing intra-urban polycentricity, and to evaluate polycentric development with respect to the Regional Development Plan of the Office of Urban and Regional Transportation (2001). The study area is the Stockholm City Region (Stockholm County) and the time period investigated was 1991–2004. Three dimensions of polycentricity are analyzed: urban nuclei size relations, spatial distribution of

urban nuclei, and potential interaction (accessibility). According to the methods' various qualifications in describing polycentric forms, the paper proposes that a combination of methods is preferable for this subject.

The polycentric structure in the Stockholm City Region exposes an increase in number of urban nuclei combined with a considerable and increasing concentration of urban resources to the major urban nuclei – Stockholm inner city (see Figure 4 and Tables 2 and 3 in Paper III). This concentration occurs in combination with an increased spatial dispersal of the urban nuclei (see Figure 4 and Table 4 in Paper III). In relative terms, accessibility has decreased with respect to accessibility by public transportation modes, and increased (workspace) or remained on almost the same level (residential space) by car transportation mode (see Figure 18). Thus, the urban structural change in the Stockholm region corresponds to the political ideations proposed in the planning guidelines. In spite of this, by the increase in relative accessibility by car and decrease in the relative accessibility by public transportation modes, the goal concerning higher share in public transports may not be possible to fulfil.

4.4 PAPER IV: URBAN STRUCTURE AND SOCIAL LIFE – PLANNING FOR THE RELOCATION OF KIRUNA TOWN.

Paper IV discusses a central issue in urban planning and design – the relation between urban structure and urban life. The paper comprises a theoretical part and an empirical part. Empirical findings concern the town of Kiruna in the far north of Sweden, which is currently being planned to be relocated as the result of the development of mining activities in the area. In order to comprehend the relation between urban structure, individuals and activities, the theoretical inquiry takes a starting point in an overview of three influential integrative social theories – Durkheim, Habermas and Giddens. Thereafter, three contemporary urban design ideals – New Urbanism, Post-Urbanism and Everyday Urbanism – are discussed. The theoretical reasoning is applied in an analysis of three different kinds of contemporary planning documents addressing the relocation of Kiruna. Analysis of these planning documents shows that they could not be consistently attributed to a specific discourse in social theory or urban design theory and are not based on any clear notion concerning the relation between urban structure and urban life.

Although planning in Kiruna emphasizes the importance of physical structures for urban life, the focus is directed towards the significance of specific buildings and spots in the town for the location of social activities. These urban objects are thus not interpreted as parts of an inclusive urban structure. The assumption explored within the paper is that this lack of ontological reflection implies a limited capacity for discussing the consequences of urban change adequately, and that subsequently, a number of consequences might be overlooked.

4.5 REFLECTIONS ON THE SUMMARIZED PAPERS

The following analytical structure can be deduced from the preceding outline of the three papers. It is noted that whilst each paper is anchored in a theoretical framework and comprises an empirical part (see Figure 1), the balance between the theoretical and the empirical differs between the papers.

The transformation of an urban structure is, in accordance with the findings of Paper I, considered to take place through the location of new physical structures like buildings, and through their use. Of interest here, to me, was the relation between the spatial configuration of urban structure, planning guidelines and the location of new urban objects. Even though Paper I is anchored in urban economics and planning theory, the focus is methodological (the impacts of

various location factors are estimated by regression analysis). Whilst urban economics and planning theory function as a *framework* for the study, it is integrative social theory and urban theory – partly presented in Paper IV – that function as a *backdrop* for the location analysis (see the dotted arrow between the theoretical part in Paper I and Paper IV in Figure 1). The results of Paper I provide evidence for – in Giddens terms – the influence of, and the balance between, the material-structural (urban centres and objects) and sanction (land use restrictions) constraints on location activity (1984: 175, 176)(see Paper I, page 358).

From the characteristics of the location activity presented in Paper I, it could be concluded that new buildings in general are not located in a way that strengthens the ‘compact city’ form. However, from this study, the actual influence of location activity on the urban structure is not apparent. Urban structural transformation is assumed to have social, economic, and ecological consequences (see Paper II, p.550-553 and Paper III, p. 19) linked to sustainability issues, and is therefore important to investigate (see dotted arrow between Paper I and Papers II and III in Figure 1). Paper II focuses on inter-urban polycentricity in the municipality of Strängnäs, and Paper III focuses on intra-urban polycentricity within the Stockholm City Region. The location pattern investigated in Paper I gave rise to a change in the urban structure (in Strängnäs municipality). This urban change is investigated in Paper II. Papers I and II are thus empirically related (see the solid arrow between Paper I and II in Figure 1).

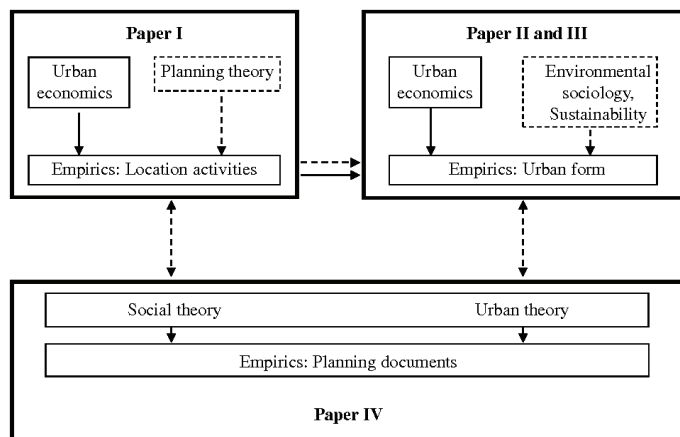


Figure 1. The relation between the research presented in Paper I - IV

Papers II and III have a methodological focus, comprising a number of complementary methods for describing important urban characteristics as density, functional mix, and urban polycentricity. Contrary to Paper III, Paper II demonstrates a weakened polycentric urban structure as well as a further-dispersed urban structure. Because the methods used and the study areas examined in Paper II and III differ, the outcomes cannot be directly compared. Social and urban theories also function as a backdrop in Papers II and III, as they (for instance) explore how urban structural change also influences opportunities for walking (Kelbaugh 2001: 14.7), and how urban densities are related to complexities in social relations (Durkheim 1899/1982: 241-242).

In Paper IV, social theory has a more prominent position. The empirical analysis of three planning documents relating to the relocation of Kiruna town are here anchored in the social theories of Durkheim, Habermas and Giddens and the urban theories labelled New Urbanism, Everyday Urbanism and Post Urbanism. Paper IV provides six hypotheses on how to understand

the urban structure and which aspects might be important in order to illuminate the relation between urban structure, urban structural change, and the individual human being. Paper IV does not, however, provide any methods to describe urban change quantitatively on a micro-level or a macro-level.

5. THEORETICAL EVALUATION OF URBAN CHANGE

Planning and spatial development in the municipality of Strängnäs, and in the Stockholm City Region, show opposing characteristics. The study of the municipality of Strängnäs exposes vague planning guidelines and tendencies toward functionally-separated urban sprawl. The study of the Stockholm City Region exposes explicit goals regarding the spatial configuration of the urban structure and a strengthened polycentric urban structure.

5.1 Planning paradigms

It seems as if difficulties remain in both the main planning approaches presented above, which could be discussed through Habermas' distinction between the life world and the system world. The reason for the evolution of a system world was the need for efficient decision making in complex situations (Habermas 1975: 297). A number of ecological and societal issues extend outside of the cultural horizon of what is possible to handle within a life world perspective (Habermas 1987: 123, 149, 232-233). This limitation in the capacity of the life world occurs especially in emergent and/or complex situations. This point seems to be overlooked within the communicative planning domain. An unbalanced planning biased towards the life world perspective or system perspective result in inefficiency or non-functional action situations possibly resulting in "destructions of urban environments" (see Habermas, 1975: 297, 1987: 294). A conclusion of this reasoning is therefore that planning procedure must adapt to, and encompass, the system perspective (in a Habermasian sense) and the life world perspective. If this reasoning is acknowledged, the question of comprehension appears. The methodological complexity in Papers I to III and the complexity in the theoretical review in Paper IV possibly position some parts of this research in an expert-planning domain. Or, using Allmendinger's (2002: 91) terminology, this research might function as an exogenous theory "focused on a particular element of the society" provide the planning domain with an further "understanding of planning and space" (Allmendinger 2002: 91).

5.2 URBAN CHANGE THROUGH A SOCIO-THEORETICAL PERSPECTIVE

The Durkheimian position

From a Durkheimian perspective, urban structural changes such as those explored within this thesis mirror changed 'collective consciousness' and changed social relations – social interdependence between people, firms and authorities. Various specific configurations of the urban structure – sprawl, monocentricity, polycentricity linearity, etc. – therefore potentially mirror specific configurations of social relations. This kind of reasoning cannot, however, be separated from the historical context in which it was formulated. Since the time of Durkheim, both physical and non-physical accessibility have increased dramatically. Thus the assumption of a linear relationship between population density and social relations cannot be accepted uncritically. However, new urban configurations should mirror the relation between urban structure and social relations in one way or another. From a Durkheimian perspective, society – and urban structure – is not possible to govern by individual initiatives in planning or other

means. Society lives its own life. Urban plans are therefore not created by individuals, but are consequences of other structural circumstances (social facts).

The results from Paper I somewhat support this theoretical perspective. The location profiles in Strängnäs are strongly influenced by structural properties such as urban plans and urban structures. The change in urban structure analysed in Papers II and III corresponds to the local and regional planning guidelines. In a Durkheimian sense, the opposing character of urban change exposed in Strängnäs municipality and the Stockholm City region should reflect different character of dependence (social solidarity) between the citizens. The relatively – in relation to the Stockholm City Region – modest urban setting in Strängnäs also implies relatively modest planning. The relatively complex urban setting in the Stockholm City Region implies a complex planning, and an explicit macro-level perspective. This macro perspective is not in the same sense needed in the municipality of Strängnäs. However, to develop a further understanding of the location activities and the changing urban structure, other social facts as such contemporary trends (“social currents”), and other institutionalized norms, should be addressed in the research.

The Habermasian position

Habermas’ theory provides a foundation for creating various hypotheses about both location process and the development of urban structure. Firstly, if the urban structure is assumed to be configured from a system perspective (i.e. in order to maximize capital accumulation), then the accumulation of capital is optimized through different types of urban development in different urban settings. In a rather dense urban setting such as the Stockholm City Region, capital is maximized through further development of the existing mixed-density urban polycentric structure. In contrast, in a rather dispersed urban setting, such as the municipality of Strängnäs, capital is maximized through further functionally-separated, sparse, urban development.

Secondly, if it is assumed that the urban structure is configured through Habermasian life world processes, then the actual urban development observed will correspond to mutual understandings on urban development established through the communicative action processes within planning. In the case of the Stockholm City Region, this mutual understanding resulted in rather firm land use guidelines, supporting a supra-individual structure. In the case of Strängnäs, an adoption of rather loose land use guidelines supporting ‘individual freedom’ took place. This latter outcome contradicts the Agenda 21 agreement and other ideations on urban structure promoting sustainability.

Thirdly – and to me the most likely alternative – planning and the evolving urban structure in both cases might be seen as a combination of the life world and the system perspective. In the case of Strängnäs, the relatively limited social and economic pressure on urban development also implies limited ambitions from the system in coordinating activities in time and space. Thereby the life world has a substantial influence on the planning procedure and on the land use plans. In the case of the Stockholm City Region, the social and economic pressure implies a substantial need to coordinate activities in time and space. Thereby the system expands its spatial ambitions, possibly “colonizing the life world” (see Habermas, 1987: 268-269, 357) through, for instance, the adoption of a regional development plan (a system product).

The location profiles presented in Paper I and the urban development presented in Papers II and III reveal a correspondence between location activity, urban development, and land use plans. Thus, this research supports the Habermasian position that *planning matters* – a macro perspective. However, the reason behind this correspondence in planning is not apparent. Further attention –

in a Habermasian sense – should therefore be paid to the relation between system and life world in planning processes.

Further, the urban structure (and other steering media) provides a spatial framework that to a substantial degree determines what kind of activities can take place, and where. The volume of those activities might, however, be governed by economic system adjustments. Different urban structures – as in the municipality of Strängnäs and in the Stockholm City Region – imply different distributions of meeting points and different extensions of public spheres. People's activities are, however, also governed by life world processes - thus in order to understand the influence of urban structure on individual activities, further analysis of the life world in the context of an urban structure is required. These issues are also linked to the possibility to achieving sustainability through planning efforts.

The Giddens position

If Giddens' theory is applied to the research on location profiles presented in Paper I, then urban objects like residential and commercial buildings and urban centres might be considered equivalent to a combination of the Giddens concepts of the *constraints of a material* and *structural character*. Land use restrictions might, further, be considered equivalent to Giddens' *sanctions*. Through an action-generating process that incorporates the spatial configuration of constraints, actions – in terms of the location of new urban objects – are then performed. Given that the results presented in Paper I demonstrate that material constraints and land use restrictions influence location activity, it might be concluded that the research presented in Paper I fits well into Giddens theoretical framework.

In Papers II and III, changes in urban polycentricity dimensions are computed based on local densities. These aspects of polycentricity might also be considered to constitute a configuration of some aspects of material and structural constraints. A changed urban structure (changed constraints) will then influence the possibility to accomplish actions, thereby influencing the reproduction of certain urban objects and their character. A central thought in Giddens' theory lies in the existence of *unintended consequences* (Giddens, 1984: 27) - that intentional individuals perform activities that have unintended consequences. Plans also have unintended consequences and, consequently, urban development proceeds in a somewhat uncontrolled way. This aspect of Giddens' theory naturally implies a restricted belief in the possibilities of planning.

The individual, in a Giddens perspective, is rather free *vis-a-vis* material constraints, external activity patterns, and urban plans. It is not possible to actually forecast action due to these prerequisites. Individual behaviour is dependent on the individual action-generating process, comprising the reflexive monitoring of possible consequences. The actual materialization of an urban plan is therefore highly uncertain, from a Giddens perspective. As a result, the importance of external factors on the actual accomplishment of activities could not be deduced using Giddens theory. The research should therefore be complemented by an analysis of other individual influencing factors in the action-generating process.

From the above, it can be seen that this research somewhat supports the Giddens position. Urban development in Strängnäs takes place *within* the spatial restrictions of the comprehensive land use plan. This plan therefore possibly both enables and constrains these location activities, in a spatial and a functional sense. However, the plan does not influence the volume of locations - the volume of activities is determined by other processes. In contrast to Habermas, Giddens emphasises the mutual dependence between individuals and the capitalist system (Giddens, 1984:

14, 16), the reflexive monitoring process (ibid.:179, 181, 213) and the existence of unintended consequences (ibid.: 27).

6. DISCUSSION

6.1 MAIN MESSAGE

The results from this thesis provide supporting evidence for the influence of local and regional planning on the location of new urban elements and on the development of the urban structure. At the international level, international planning agreements (Agenda 21) have not, however, generated effects discernable through this research. The location profiles in the municipality of Strängnäs presented in Paper I expose strong dependence on the local planning guidelines and on the physical relation to a number of urban object types. The development of the urban structure in the municipality of Strängnäs between 1992 and 2000 and in the Stockholm City region between 1991 and 2004 corresponds with the planning guidelines in the respective area. In the municipality of Strängnäs, the planning guidelines do not include any explicit goal for the development of urban structural properties. In contrast, in the Stockholm City Region, explicit goals on the formation of the urban structure exist. In the first case, neither the monocentric urban structure nor the polycentric urban structure is observed as strengthening. In the latter case, a hierarchical polycentric urban structure is evolving.

This evaluation of planning achievements has been possible by combining spatial methods for analysing local urban densities with spatial methods for analysing patterns within the urban structure (in the cases of Strängnäs and the Stockholm City Region, urban polycentricity). According to the socio-theoretical framework used here, these urban changes do – although depending on theory to a varying degree – effect individual behaviour. For instance, the Habermasian belief in the possibilities of coordination people's action in time and space through monetary and administrative steering media (hence also planning) implies also a belief in the possibilities of achieving the political goals of economic, social, and ecological sustainability. A prerequisite is, however, an acknowledgement of the system perspective (in a Habermasian sense) and the life world perspective.

6.2 CRITICAL ASSESSMENT

Some critical comments could be highlighted. Firstly, even though the research presented in Papers I to III generally corresponds to the integrative social theories presented in Paper IV, the overall design of the research might have been further related to the findings presented in Paper IV. Such explicit anchoring in social theory would have been useful in order to manage the research and relate it to other societal phenomena, as well as in the formulation of relevant conclusions. However, I do not suggest that the incorporation of all aspects – like, for instance, the possible influence of power, or the subjection of the individual by various discourse formulations – is desirable. Whilst I regard these aspects as important constituents in urban research, the aim here is not, of course, to perform research which addresses all aspects of society. Secondly, the results presented also have uncertainties due to limitations in data and methods. For instance, the estimations of densities and the urban structures depend on the quality of data and on the design of methods in density estimations (see Papers II and III). Presented conclusions on the implication of the research presented in Papers I to IV depends on the 'frame of understanding'. Due to the lack of agreement on what kind of real effect a changed urban structure might imply, conclusions in these matters naturally are uncertain.

6.3 Conclusions

In drawing conclusions from the preceding discussion and the subsequent papers which compose this thesis, the practicalities of the research will here be addressed.

According to its focus on methods, this research provides prerequisites for the future development of useful planning tools. The research in Papers I and IV provide new knowledge for the planning process, by defining the factors which influence location activity, and revealing the importance of urban structure. Papers II and III also acknowledge the importance of urban structure and build upon this insight to provide a number of spatial methods to describe functional mix, urban densities, and urban polycentricity. These methods might well serve as tools to compute the future characteristics of urban structures resulting from planned urban changes. They could also be used to estimate the fulfilment of efforts in land use planning.

These aspects of the research – both discursive and methodological – could be used in measuring progress towards sustainability. For instance, the definition of possible sustainable urban structures might be developed further if the discourse formation is positioned in a societal framework as described above. Apparently, basic concepts and methods employed in the ongoing debate – such as the definition of urban density – still need to be anchored in the planning community. As the characteristics of the urban areas addressed within this research (mixed functionality, densities, polycentricity, accessibility) are central constituents in the debate over describing sustainable urban structure, this research might well contribute to increasing the possibility of measuring progress towards sustainability from an urban planning perspective.

This research does not comprise any specific analysis of the relation between urban structure and ecological sustainability, economic development, or progress in social welfare. The contribution of this research in formulating ‘guiding planning policies’ is of minor significance. However, the research provides evidence for the influence of urban planning and urban structure on location activities and on the development of urban structure. Further, the research presented here also provides evidence for the importance of planning policies. Planning thus emerges as a tool for achieving certain urban structures and thereby, possibly, sustainability.

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