AALBORG UNIVERSITY

Policy integration as learning process. The integration of social and environmental objectives in Århus municipality's urban planning policy

Simone Franceschini
5/24/2011

"When I saw this place for the first time, I realized that the serene environment of the café actually concealed a chaotic universe. The café was filled with ideas and viewpoints from all corners of the world, and these ideas were intermingling and colliding with each other.

There is another place just like Peter's Café, but it is not in the Azores. It is in our minds"

From the book "The Medici effect" (2006)

Contents

Introduction

City represents the most important modern form of settlement for human being and trends show that the share of people living in urban areas will increase in the next future, creating growing interest towards the analysis of the dynamics that occur there.

Several interactions happen there generating important effects. Many aspects of the contemporary economic changes "make cities more, not less, important as principal sites for innovation, creativity and the production of knowledge–intensive goods and services" (Wolfe & Bramwell, 2008). The interactive and social nature of innovation makes city-regions the ideal space in which social learning processes can unfold. This refers not only to private actors, but to the policy making process and institutional framework too. Urban policies define and shape cities, enhancing or discouraging relations and networks between people, and influencing ways in which relations happen. Such policies generate feedback effects, creating path-dependent patterns of development. Systemic approach can explain better than linear one the relations between policy making process and the urban context. Feedbacks create space for different patterns, as any observer can see the difference between a modern western city and an Asiatic one or African one; furthermore, also among western countries, several distinctions happen, as differences between an US city and an European one show. Under this light, cities are a mirror of the whole society, carrying formal and informal institutions that are embed in the society. Studying city is a way for studying the overall dynamics of the society that reside in specific geographical and cultural contexts.

Human being are facing important environmental and social problems in which cities play a crucial role, both as cause and potential solution. My interest, in this project, is about how policy institutions tackle the negative aspects of urban sprawl,

including social and environmental aspects in transport and urban policies. It is my opinion that this represents an interesting living problem that involves academic knowledge, policy-making process and values. These concepts are at the base of concepts as institutional learning and policy innovation, where changes and breakdowns are needed in order to overcome routines that do not perform in satisfactory ways. For this reason, using urban planning as the concrete topic of study, I would like to investigate the process of policy learning where knowledge transfer happens and where public institutions are directly involved. Due to the importance of external factor, a case study is needed in order to define concrete processes that may occur in different ways in other contexts.

My hope is that this analysis may provide some highlights about the concept of knowledge and learning in public institutions, representing a way of testing such concepts in a concrete case.

Design and methodology of the case study

Definition of the problem (problem formulation)

Approximately 75% of European population lives in urban area, and about a quarter of European land has been affected by urban land use (European Environment Agency, 2006). Cities represent the most important modern form of living, and this influences deeply social, economical and environmental dimensions. The economical role of cities is undoubted; they represent the space where diversity and interaction feeds creativity, learning and innovation.

Urban areas have also created, influenced and boosted several social and environmental problems that are more or less discussed in the political agenda all around the world, as well as in Europe. There is a growing awareness that environmental and social aspects should be addressed together with other aspects, in order to assure that policy making process follows sustainable patterns.

The European level plays an important role in promoting such policy integration, even if the institutional framework and principles give to the local communities the legal power. In such context, the EU Commission, according to the principle of subsidiarity that decisions should be taken as closely as possible to the citizens, recommends integration of transport and land planning policy making process, both at national and local level, in order to tackle negative aspects related to current environmental and social trends in urban areas. For instance, EU Commission states that "when taking land-use planning or location decisions, public authorities and companies should take into account the consequences of their choices in terms of travel needs of clients and employees in addition to the transport of goods" (European Commission, 2009, p.19).

Such poor environmental performances together with a growing awareness towards ecological limits of our world require changes in policy making process, as

highlighted by the EU recommendations.

Changes of institutions and policy frameworks require new knowledge, gained through a process of institutional learning. The knowledge approach focuses on the idea that organizational routines and structure embed knowledge, so the integration of new knowledge forms new routines and processes, which is where the exploitation of knowledge occurs, with the potential ensuing benefits (Nelson & Sidney, 1982; Zahra & Gerard, 2002).

The concept of policy learning is the very core of the project. In order to analyse this aspect, the project considers environmental policy integration (EPI) as a way to represent learning phenomena. According to that, a first researching thesis is defined as follows:

- *Policy learning occurs through a process of integration between transport and land development policies. Integration can be referred to policy objectives, strategies and instruments and can involve different actors and political institutions*

It is important to highlight that EPI is neither consider an output nor an input of the learning process, but it is a phenomenon of learning. It represents an evolutionary approach where the distinction between means and ends is hard to distinguish because of interactive feedbacks of learning process (Gregersen & Johnson, 2010).

Furthermore, learning is a process that is influenced by stakeholders and the broader environment. It is neither a-temporal nor non-spatial phenomenon, because the shape and direction of learning is path-dependent and influenced by the surrounding context. It means that learning is not only "what" is learnt, but "why" is learnt, as well as "who" and "how" learn. The second researching thesis, defined as follows, wants to investigate these dimensions of the learning:

- *Learning could be a crisis-driven phenomenon or a process of*

> *incremental improvement of knowledge embedded in organizational routines. Crises or advances in organizational knowledge shape pace and direction of policy integration.*

The project carries an explanatory approach (Arbnor & Bjerke, 2009, p.232), because its aim is to formulating hypotheses that should be tested and verified. This permits to confirm or discard the validity of the hypotheses[1]. The project does not want to forecast potential future patterns that would require the definition of a model.

The analysis is rooted in specific relations between transport and land developments. It focuses on the development of non-motorized transport systems in relation to urban development and general outcomes in term of social welfare.

Relations between transport and greenhouses emissions are nowadays accepted and well-known, even if these relations often do not find concrete consideration in policies. Instead, wider relations between automobile-based transport systems, urban developments and effects on social relations are less popular in the political debate, although if literature is quite reach of researches. The project's aim is to find policy learning, through EPI, in the process of focusing on social welfare, through encouraging non-motorized trips in vibrant neighbourhoods.

Using a case study's approach

The project uses a case study in order to analyse the researching questions. Yin suggests case study approach when the following aspects are present:

- The investigation is about a contemporary phenomenon;
- boundaries between phenomenon and context are not clearly defined[2];
- phenomenon is a complex-system object composed by irreducible

[1] At least in the specific context of the analysis. generalization should be considered carefully.
[2] In other words when phenomenon is high-context dependent

objects;

- when researcher has no control on phenomenon investigated;
- researcher´s interest is about why and how the phenomenon happened.

The case study´s design defines two theses that may represent potential finality relations. I am aware that this approach represents a strain of systematic analysis, in which "it is not until real systems *are contracted and studied in detail* that the concrete finality relations that are to be studied can be started" (Arbnor & Bjerke, 2009 p.238). Anyway the chance of stating potential relations is allowed where they are based on existing and established theories (Arbnor & Bjerke, 2009 p.239). This is the current situation, where developed theoretical models exist in the realms of learning and knowledge, EPI and transport and urban policies. Hence, I perform a narrow case study's analysis, with the aim of validating ex-ante theses. Wider approach, based on the definition of new or uncommon patterns, may emerge only in the case of analysis without ex-ante well defined hypotheses.

The selection of the case study

The selection of the case study is critical for two main reasons. First one, a case study should be defined according to the availability of information; a good case study should allow convenience access to critical information. Second point, the case study influences the degree of generalization that can be generated. Every case study represents a portion of reality, so this influences at which extent the analysis can be applied to other contexts.

According to such reasons, I have selected the Århus' municipality as case study for the following reasons:

- Århus is the second largest city of Denmark. It has a well developed bureaucracy and organizations, that represents the main focus of the

project.

- The city of Århus is growing fast. Municipality has planned that in the next 20 years there will be 75,000 new inhabitants, 20,000 new homes, 50,000 new jobs. It means that urban development policy is a priority in the political agenda.
- The city of Århus has planned to be CO2 neutral by 2030. It means that environmental objectives are in the political agenda.
- The city of Århus has important transport plans and projects, like the cycling action plan and the construction of a light rail system. These projects could have important impacts on future land developments.
- The city of Århus has hosted, in 1998, "The Århus convention" that claims the right of everyone to receive environmental information that is held by public authorities and the right to participate in environmental decision-making. I expect that the Århus municipality should grant easy access to information.
- I live in Århus and it helps to perform face-to-face interviews in order to collect information and overcome language barriers, due to the use of Danish as language in official documents.

Methodological aspects

Distinction between unit of analysis and unit of data collection is the first methodological aspect. The unit of analysis represents the object that researcher wants to analyze; instead the unit of data collection is the source used to collect information. Both of them can be individual or organizations, as the scheme follows (Yin, 2003):

		Unit of data collection	
		From an individual	From an organization
Unit of analysis	About an individual	Individual behaviors Individual attitudes Individual perceptions	Archival records Other reported behaviors, attitudes and perceptions
	About an organization	How organization works Why organization works	Personnel policies Organizational outcomes

Table 1 Areas used in this project are pink

The main unit of analysis of the project is the organization. EPI and sectorial policies are carried by organizations, so focus is mainly on organizational outcomes and how and why organization works. Anyway individual perceptions can give a deeper understanding about learning process, so an analysis about individuals is performed. It is not possible to perform an analysis of individual behaviors, due to the time required by such observations.

Units of data collection are individuals and organizations, collected through primary information (new data) and secondary information (used in other analyses). Primary information are collected only through interviews, because it was not possible to perform experiments or observations. Secondary data are collected through official documents and interviews. It is expected that the use of Danish language should be a critical barrier in this case. Same problems might happen about collection from organizations.

The definition of interviewees follows the technique of "roll a snowball" (Bijker, 1997 p.45). The project has initially identified a limited number of actors that are considered relevant for the analysis. During the interview, I have tried to define new stakeholders that may be relevant to interview in order to gain more knowledge. It means that first interviewees define the following actors, because they indicate new contacts. When new contacts emerge, there are not any new actors, so the picture is considered completed. This technique permits to shape relations between actors too, because it gives additional information about interactions between actors.

The overall framework

Theoretical background is rooted in three main fields: knowledge and learning phenomena; interactions between transport and land use policies; and policy making process with a focus on EPI. Each of those fields represents a specific researching realm, and elements used in this project are presented in separated chapters. Anyway it is important that relations between them are unveiled, otherwise the project looks like three autonomous projects. The aim of this chapter is showing, at the conceptual level, how these fields are related each others.

The project focuses on policies to tackle urban sprawl, generating vibrant quarters with environmental friendly transport systems. Transport systems may reduce urban sprawl, because they influence urban density, and influence positive and negative social effects that should be assessed in any urban project. The relation between transport and land policies is the first basic concept. Administrative bureaucracy is today usually based on sectorial division of tasks and functions, so any policies that would like to analyze transport and urban sprawl with assessments of social and environmental effects should integrate the tasks of different departments. As EPI shows, the benefits of integrating policies are already well-known, as confirmed by literature about urban sprawl too.

Tackling urban sprawl requires strong commitment, due to the magnitude of such phenomenon. Policy making process has changed over the time, introducing the assessment of environmental and social factors influenced by urbanization. This awareness has generated different approaches to urban development policy, and this has created the premises for processes of urban requalification and transformation in areas where environmental and social performance were not considered satisfying. EPI and urban policies carry macro-level approach, in which policy-making process is considered the basic unit of analysis. But I would like to focus on individual and

organizational behaviors, so the concepts of learning and knowledge are introduced. This means that I consider EPI and relations between urban and transport policies as learning phenomena. This is coherent with the knowledge or learning based economy approach, where learning is the critical factor that influences performance of individuals and organizations.

This perspective cannot analyze policy making process only at the level of EPI, so it requires a further step in creating connection between EPI and urban policies with learning aspects. If learning is a process which changes the state of knowledge of individuals and organizations, than the evolution of EPI and urban development policies should be considered as changes in the state of knowledge too. Under this perspective, policies are based on beliefs, and it is coherent with the idea that changes in state of knowledge may take the form of the adoption of new beliefs, the modification of the existing belief, the abandonment of previously held beliefs (Cross & Israelit, 2000).

In the current case study, this implies that **evolution over the time of EPI and urban development process is linked to individual and organizational changes, that may be "captured" through changes in the current beliefs (in a wide sense) and knowledge.** Individual and organizational routines may reflect these changes, so the analysis would like to match changes in urban trends and policy outcomes with organizational and personal routines.

I consider the concept of learning the best way to explain the process of policy changes. But learning resides over the concept of knowledge, so it is the interaction of knowledge and learning concepts that could explain the process of changes. Where knowledge is considered the most important resource in the learning economy, learning is deemed to be the most crucial resource creating process.

Defining knowledge like the most important resource does not mean that there

is an intensive use of knowledge, "but rather that knowledge becomes obsolete more rapidly that before" (Lorenz & Lundvall, 2007 p.13). This statement carries interesting consequences for this project, because it focuses on the idea that policy making process is subject to stress due to the need to change. This is the very concept on which the analysis is rooted. And it represents a critical point too: if policy process is not subjected to change, than this approach could be less useful. This requires that the project has to prove that transport, environment and urban development are showing important changes, and that those changes are somehow related with changes in the environment and/or beliefs.

It is evident that the scale of phenomena involved in this approach is very wide and should require longer period of analysis than some months. For this reason, the aim is highlighting some specific elements and connections without defining an overall evolution of the process over the time.

The concept of knowledge and learning

Organizations evolve in different ways over the time. Diversity may be analysed through different perspectives and approaches. Globalization is considered, looking at firms' side, the most important factor why knowledge and learning are becoming more important. For instance, Lundvall and Lorenz defines the current era as "the globalising learning creative economy" where "responding to more intense and global competition firms make attempts to compress and speed up processes of knowledge creation and learning" (Lorenz & Lundvall, 2007 p.2). Knowledge and learning are becoming important resources for any organization. The term "knowledge-based resource" refers to "the skills, abilities and learning capacity….that a person could develop through experience and training" (Denisi, Hitt, & Jackson, 2003 p.7) and it is consider a strategic resource that depends on individual skills and organizational structures. Actually there is an important conceptual difference between knowledge-based and learning approach. The former focuses on the value of knowledge as an asset, so the increasing of knowledge stock produces better performance, while the latter focuses on the process of learning and forgetting, where knowledge becomes less important, while the ability of learn and change is a crucial factor.

These concepts are usually used to analyse business competitive environments, but it is possible to extend the importance of knowledge and learning to the public organizations' environment. Globalization is not only occurring by opening new markets, but it involves broader concepts and effects. Local communities are facing with new trends and challenges that interact with supra-local dimensions. For instance, environmental problems are provoked by interaction of local and global causes. This does not refer only to the biological realm, but included people behaviours, such life-style and values. For instance, urban sprawl has been considered usually a local problem, because it has direct relations with local policies,

instead it represents a global trend among many countries, where urbanizations, changes in people's behaviours and values, and increasing of personal incomes are global trends. At the same time, local communities are more connected and movements of people and organizations are easier than in the past. This provokes an increasing competition and cooperation between local communities in order to increase their own welfare. It is clear that public organizations have to produce more high quality policies in order to keep and attract valuable resources in an evolving environment. But, like firms, public organizations evolve differently, and focusing on knowledge and learning may help to explain reasons behind different patterns and drivers of changes.

Next paragraph focuses on different knowledge taxonomies and learning processes, defining different ways in which these elements may be analysed.

Knowledge taxonomies and learning process

Knowledge is a slippery object, many taxonomies are possible. In order to make a selection, only taxonomies used in the project are analysed here. They represent popular taxonomies, used by several researchers[3].

Nonaka taxonomy: explicit and tacit knowledge

Nonaka uses the concept of explicit and tacit knowledge (Nonaka, 1994) starting from the idea that a person knows more than can tell (Polanyi, 1966). Nonaka states that "Knowledge that can be expressed in words and numbers only represents the tip of the iceberg of the entire body of possible knowledge" (Nonaka, 1994 p.16). Explicit is codified knowledge that can be transmitted through formal and systematic language. Instead tacit or codified knowledge is rooted in actions, beliefs and is

[3] Some parts of the text in the following paragraph have been written for previous semester projects

context dependent.

Polanyi has been the first one to define the concept of tacit knowledge, remarking that explicit knowledge is always grounded on tacit knowledge. He considered tacit knowledge almost impossible to transform in explicit due to the distinction between "focal" and "subsidiary" awareness[4][5] (Nonaka & Von Krogh, 2009). Nonaka does not carry so strong position as he stated "some knowledge must move along the continuum from tacit towards scientific knowledge that eventually becomes knowledge independent of the scientist who created it in the first place. This process of "moving along the continuum" is more fluid than a discrete shift from subsidiary to focal awareness" (Nonaka & Von Krogh, 2009).

According to Nonaka, tacit knowledge includes cognitive and technical elements. Cognitive models are represented by mental models "in which human beings form working models of the world by creating and manipulating analogies in their minds. These working models include schemata, paradigms, beliefs, and viewpoints that provide "perspectives" that help individuals to perceive and define their world.",(Nonaka, 1994 p.16). Instead technical elements include crafts and skills useful in specific context. Cognitive elements carry predictive elements: they help to define the reality and make forecasts about future. Technical elements are "tools" giving ability to solve contingent activities.

Explicit knowledge can be captured and recorded, whilst tacit one moves only through interactions. In a following publication, Nonaka (Takeuchi & Nonaka, 1995) defines better these concepts. Explicit knowledge is knowledge that can be expressed

[4] The Polanyi's position may be understood within the context in which he elaborated such concept. He tried to balance the influence of the positivism in science that was grounded on the concepts of "pure" knowledge and faith towards human brain and capacity to understand and explain all the phenomena in a rational and codified way.

[5] Distinction between focal and subsidiary awareness resides on the cognitive element that a person cannot be, at the same time, focused on the task and the tool. Nonaka and Von Krogh say that "Either my focus is on the hammer with which I want to drive the nail into the wall or on the task of driving the nail into the wall" and the learning process is disturbed when attention shifts between tasks and tools (that represent language and writing).

in words, numbers, and easily communicated and shared in the form of hard data, scientific formulae, codified procedures, or universal principles. For example, the design of the product, market forecast operations procedures, product specifications, software code, and technical standards. Explicit knowledge can be **object based** or **rule based**. Knowledge is object based when it is represented using strings of symbols (words, numbers, formulas) or is embodied in physical entities (equipment, models, substances). It may be found in artefacts such as products, patents, tools, prototypes, photographs and so on. On the other hand, explicit knowledge is rule based when the knowledge is codified into rules, instructions, specifications, methodologies, classification systems and so on.

Learning aspects

Knowledge creation starts from individuals. Nonaka states that "organization cannot create knowledge without individuals. The organization supports creative individuals or provides a context for such individuals to create knowledge. Organizational knowledge creation, therefore, should be understood in terms of a process that "organizationally" amplifies the knowledge created by individuals, and crystallizes it as a part of the knowledge network of organization." (Nonaka, 1994 p.17). Nonaka introduces different levels of analysis: formal vs informal interactions, and intra or inter-organizational interactions. These concepts represent "the level of social interactions", bud they do not represent themselves triggers of learning. In order to start a learning process "there are three basic factors that induce individual commitment in an organizational setting; "intention," and "autonomy," and a certain level of environmental "fluctuation."" (Nonaka, 1994 p.17).

Intention refers to the state when a person raises attention toward a phenomenon. It represents an action-oriented concept. It is related to the concept of routines and mental models, where the external inputs that activate personal attention are selected, according to personal mental models, based on values, interests, beliefs

and experience. Nonaka states that intention is more concerned with future´s aspiration than current state.

Autonomy is based on the assumption that people carry different intentions (or mental models), so "by allowing people to act autonomously, the organization may increase the possibility of introducing unexpected opportunities of the type that are sometimes associated with the so-called "garbage can" metaphor" (Nonaka, 1994 p.18). It happens because people with different intentions need autonomy in order to arise interest about something, but it also allows people to explore different patterns and meanings.

Fluctuation refers to the change of external environments. Discontinuity creates triggers to activate "new" intentions; instead repeated routines reduce attention and focus on new patterns. Nonaka defines discontinuity in term of break-downs, where "Break-down refers to the interruption of an individual's habitual, comfortable 'state-of-being.' When breakdowns occur, individuals question the value of habits and routine tools, which might lead to a realignment of commitments" (Nonaka, 1994 p.18).

Different levels of interactions and individual commitment elements are elements that enable knowledge creation and transfer that is composed by tacit and explicit elements.

Knowledge transfer occurs between explicit and tacit forms in all possible directions. Nonaka defines socialization the creation of tacit knowledge from tacit knowledge and combination the creation of explicit knowledge from explicit knowledge. But there are also rooms for internalization (from explicit to implicit) and externalization[6] (from implicit to explicit). The central theme is that these 4 different

[6] Nonaka states that creation of methaphors is a powerful way to improve externalization of knowledge (Nonaka, 1994 s. 20).

learning ways are related in a spiral way, so connections between them are the crucial factors to improve learning outcome.

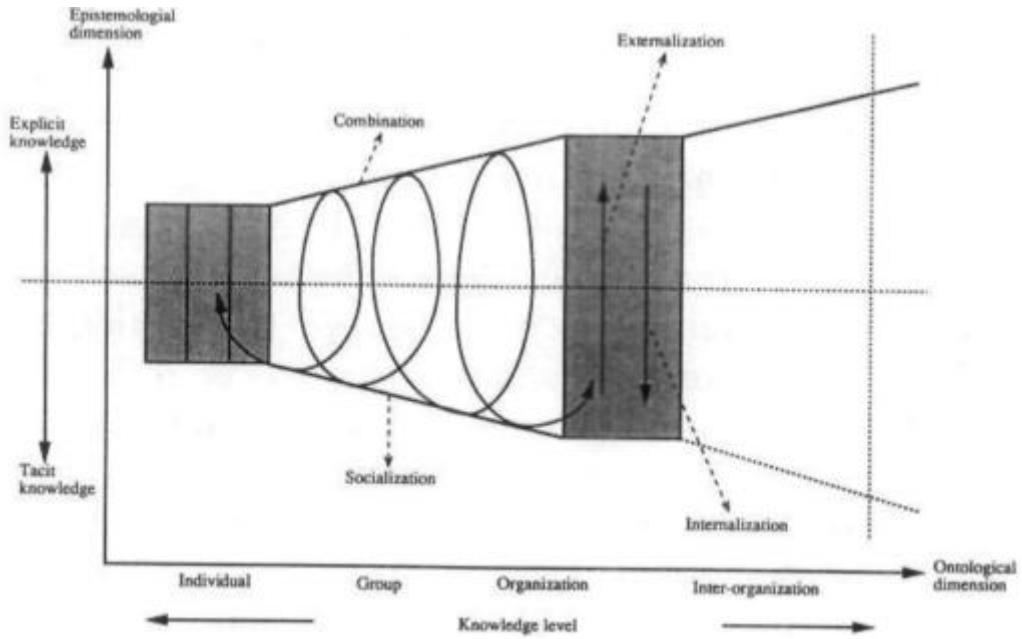


Figura 1Nonaka spiral's model of learning

The first element of the spiral process is the enlargement of individual´s knowledge that helps to accumulate tacit knowledge. "High quality" experiences are key elements, where high quality means that experiences are various but related. Knowledge of experience is considered a second important element, defined by Nonaka as "an embodiment of knowledge through a deep personal commitment into bodily experience" (Nonaka, 1994 p.22). It means that learning involves the whole body; it is not only a mental activity.

The enlargement of individual´s knowledge permits the creation of personal perspectives and enables the social interaction of experience. This is boosted by the creation of common fields of interactions and self-organized teams in which members, usually with different backgrounds or from different departments, cooperate to create new concepts. Teams create trustiness and permit people to share knowledge, it happens when members confront individual experiences in order to

facilitate the creation of common perspectives.

When the team has built relations and common perspectives, there is need of articulate and conceptualize these findings. This phase is focused more on externalization and it is based mainly on dialogue. Here redundancy of information is a key factor, because it enables team members to overlap each others and defining common elements. Than conceptualization comes from deduction, induction or abduction processes.

Conceptualized elements need to be assimilated by team members, this is the internalization phase that introduces again elements of tacit knowledge, but it represents a collective process.

Internalization represents the starting point of the Nonaka´s analysis, because new explicit and tacit knowledge is created, so spiral can run again using the same phases.

Lundvall and Johnson taxonomy: from know-what to know-who

Lundvall and Johnson (Lundvall & Johnson, 1994) propose taxonomy of knowledge in: know-what; know-why; know-how and know-who, built on the distinction between tacit and explicit forms of knowledge.

Know-what refers to knowledge about facts. Here, knowledge is close to what is normally called information - it can be broken down into bits. It is a kind of knowledge that can be brought into databases and search machines. ICT has made this kind of knowledge much more accessible all over the world.

Know-why refers to knowledge about principles and laws of motion in nature, in the human mind and in society.

Know-how refers to skills - i.e. the capability to do something. It might relate to the skills of manual workers. But actually it plays a key role in all activities in the

economic sphere. The businessman judging the market prospects for a new product or the personnel manager selecting and training the staff have to use their know-how. The know-how built up through learning by doing, using and interacting is difficult to measure. Human capital measurements may register formal investment in education.

Know-who involves information about who knows what and who knows to do what. But it also involves the social capability to co-operate and communicate with different kinds of people and experts. Communities of experts are an example of building know-who knowledge. But it is also developed in everyday relations where relational learning playing an important role. Know-who, like know-how, is not easy to capture through standard measurements.

The taxonomy allows interactions between the different forms of knowledge. For instance, know-who and know-how are strictly related concepts, because know-how is embodied in specific people and it is hard to transfer. But relations are more complex. Know-why, as for example in labs, requires training, analytical skills, so it requires always know-how ability. A researcher is not simply anyone that could study some topics, but researchers have embodied qualities, developed thank to trainings, internees and other personal traits and experiences. There are many potential examples, but the very concept is that this dichotomy is based more on different channels of learning, that could overlap each other (Lorenz & Lundvall, 2007 p.682).

Learning aspects

The focus on interactions between different forms of knowledge represents an important way to shape learning processes.

Lundvall and others (Jensen, Johnson, Lorenz, & Lundvall, 2007) define two ideals mode of learning: **STI-mode** and **DUI-mode**. STI is the acronyms for "Science, Technology and Innovation", whereas DUI means learning by "Doing, Using and Interacting".

STI approach is based on the assumption that technologies "should be understood as involving both a body of practice, manifest in the artefacts and techniques that are produced and used, and a body of understanding, which supports, surrounds and rationalises the former" ((Nelson, 2004) in (Jensen, Johnson, Lorenz, & Lundvall, 2007)). It implies that research applications do not have direct influence in technology advances, due to the need of creating a body of understanding. Researching activities help to develop know-why knowledge, but it is only within the running context that this knowledge produces appreciable outcomes. Hence, it is right to say that STI-mode relies on the development of know-why, but it does not imply that there is not a role for know-how knowledge. STI-learning happens as interaction of know-why and know-how, where codification is considered a critical factor because it permits to formulate problems in formal and scientific modes. Codification helps to create a body of potential global knowledge, because "It is not sufficient that the results are kept in the individual scientist's memory as tacit knowledge" (Jensen, Johnson, Lorenz, & Lundvall, 2007). But relations between know-why and know-how imply that this global knowledge cannot be transferred simple by books and other codified ways, but it happens through complex relations where knowledge is shared. STI learning may be measured through R&D activities, labour skills and collaboration with other researching activities, but its value depends on implementations of DUI measures too.

DUI-mode learning is based on the idea that "much of practice in most fields remains only partially understood, and much of engineering design practice involves solutions to problems that professional engineers have learned 'work' without any particularly sophisticated understanding of why" ((Nelson, 2004) in (Lorenz & Lundvall, 2007)). Interactions and shared routines are crucial factors of DUI learning, due to the importance of know-how and know-who forms of knowledge. Organizational design "in particular, organisational practices such as project teams,

problem-solving groups, and job and task rotation, which promote learning and knowledge exchange, can contribute positively to innovative performance" (Jensen, Johnson, Lorenz, & Lundvall, 2007 p.684). Lundvall et al. present a more complete list of organizational design features: interdisciplinary workgroups, quality circles, systems for collecting proposals, autonomous groups, integration of functions, softened demarcations and cooperation with customer (and I add cooperation with suppliers and other stakeholders too).

But DUI-mode occurs through informal connections too. Connections may depend on personal and social relations and they could be beyond boundaries of organizations.

Empirical measures show that STI and DUI modes have mutual benefits because "firms with an exclusive focus on developing their science and technology base are foregoing important gains that could be reaped by adopting practices and measures designed to promote informal learning by using, doing and interacting." (Jensen, Johnson, Lorenz, & Lundvall, 2007 p.690) and that only DUI mode might be not enough.

Organizational design does not focus only on specific aspects and procedures, but it implies an attention to the overall learning organization. Lam (Lam, 2005) reviews six different types of learning organizations[7]:

- **Simple structure**, based on entrepreneur ability of scanning and innovating. Not complex structure; little formalization and standardization; coordinating mechanism based on supervision of single person; present in small and young organization; highly centralized structure; flexible and adaptive structure.

[7] Following list and description is taken by my 8th semester project

- **Machine bureaucracy**, based on rigid routines. Highly defined work processes; tasks are specialized; distinction between line and staff workers, whose work is guided by strict rules. Coordination mechanisms are based on standardization. This structure is typical for large mass production Firms. Employees are under tight supervision and usually perform simple repetitive tasks. It has a slow learning process specially related to discontinuous innovation and it is less adapt to change. It can perform well in terms of incremental learning process in stable context.
- **Professional bureaucracy**, based on complex operating tasks that workers can themselves understand and therefore they can gain more control over the work process. This oranization allows standardization and decentralization at the same time. Based on innovative skills of experts, can be highly innovative; learning can be spread in the organizations without coordination. In this way this organization can be good to acquire knowledge, and less to generate sharing useful learning
- **Divisionalized form,** based on the presence of autonomous units, controlled by central management structure. It can have very deep knowledge, but different among divisions. Learning process can happen at different pace in the organization.
- **Adhocracy** - flexible and adaptive organizational structure, organic with little behaviour formalization. Tasks are specialized horizontally, organized into ad hoc project teams. Individuals' knowledge and skills are required to solve tasks, and organization learns and unlearns quickly within an unstable structure. This structure may lack of long period vision. Everybody has the possibility to innovate, management ensure a setting that foster creativity and innovation. Organization avoids any use of standardization for coordination. It has very weak boundary respect to

the external environment.

- **J-form**, illustrated by the Japanese type of organization, concentrates on the knowledge that is embedded in its operating routines, team relationships, shared culture. Learning occurs within the organizational community. Knowledge is generated through the fusion, synthesis, combination of the existing knowledge base. Oriented towards developing incremental innovation strategy and successful in mature technological fields, where combinations and incremental improvements. Strong emphasizes on tacit knowledge can hamper learning new knowledge from external sources.

Focus on learning organization represents an instrumental approach to shift attention from "accidental learning" that occurs because of people relations, to "intentionally learning" where organizations promote learning through interactions. The basic idea is that boosting DUI-mode learning may help organizations to improve overall performance.

Asheim and Coenen taxonomy

Asheim and Coenen (Asheim & Coenen, 2006) propose taxonomy based on the relation between codified and tacit knowledge. They distinguish between **analytical** and **synthetic** knowledge, that represent "different mixes of tacit and codified knowledge, codification possibilities and limits, qualifications and skills, required organisations and institutions involved, as well as specific innovation challenges and pressures from the globalising economy" (Asheim & Coenen, 2006 p.165). Later, Asheim introduces **symbolic** knowledge too, in order to explain the dynamic evolution of new media, design and fashion.

According to them, **analytical knowledge** occurs "where scientific knowledge is highly important, and where knowledge creation is often based on cognitive and

rational processes, or on formal models." (Asheim & Coenen, 2006 p.165). Knowledge inputs are more codified here "due to several reasons: knowledge inputs are often based on reviews of existing studies, knowledge generation is based on the application of scientific principles and methods, knowledge processes are more formally organized (e.g. in R&D departments) and out- comes tend to be documented in reports, electronic files or patent descriptions.". It does not mean that tacit knowledge is less important, because it is always needed in order to understand, develop and applied codified knowledge to new contexts.

Synthetic knowledge occurs "where innovation takes place mainly through the application of existing knowledge or through new combinations of knowledge. Often this occurs in response to the need to solve specific problems coming up in the interaction with clients and suppliers." In this case tacit knowledge seems more important, due to the importance of skills and experience.

Symbolic knowledge occurs where knowledge is strongly linked to a deep understanding of the habits and norms and everyday culture of specific social groups.

Learning aspects

Asheim and Coenen taxonomy does not add new information in term of learning processes. But this taxonomy gives an overview about the quality of single organizations. More synthetic or analytic oriented organizations are expected to have different approaches and routines. This information permits to shape organizations within specific stereotypes, providing overall insights.

Effects of car-based transport and urban development policies on land consumption and social relations

Trends of land consumption: why urban sprawl matters

Approximately 75% of European population lives in urban areas (European Environment Agency, 2006) and about a quarter of European land has been affected by urban land use. By 2020 the share of population living in urban areas will increase up to 80% and up to 90% in some European countries.

Urban sprawl is defined as "unplanned incremental urban development, characterized by a low density mix of land uses on the urban fringe" (European Environment Agency, 2006 p.5). Urban sprawl was a typical US phenomenon, started in the 20th century, and based on the increasing car motorization and personal preferences for detached houses with own gardens. European tradition, due to different economical, military and social patterns, was mainly based on compact and closed cities with high density and high mix of land uses. But, from the 1950s, European cities have suffered for a growing sprawl, and now this represents a common phenomenon in all countries; dense and closed quarters have been replaced by free standing blocks and houses.

From the 50s, European cities have expanded by 78% on average, whereas population growth was on average 33%. Recent reports (European Environment Agency, 2006) show that almost 90% of new urban areas, built after the 50s, were low-density ones. Sunderland, Copenhagen and Brussels have marked almost 100% of new built areas as low-density. Only in 5 out of 24 cities, analyzed in the report, there were more than 50% of high density new urban areas, and only in 2 cities growth of population was bigger than growth of new constructions. It results in an increasing urbanization of about 5,4% (8.000 km2) in only 1990-2000.

Urbanization and household consumption have been influenced by many

patterns, like life-style, transport systems and leisure. Today there is an increasing reliance on different environmental aspects, but at the same time "sprawl threatens the very culture of Europe, as it creates environmental, social and economic impacts for both the cities and countryside of Europe" (European Environment Agency, 2006 p.5).

An explanation of urban sprawl

Economics literature has investigated reasons that produce urban sprawl. The first element is the lower price of accommodation in suburbs, whereas inner areas experience quite expensive accommodations. In this sense, urban sprawl helps low-income people to live relatively close to urban areas, where the lower price is compensated by more commuting time and lack of facilities that usually are present in urban areas. This phenomenon does not happen always in the same way. For example, in several US urban areas inner area accommodations have lower price than suburbs. Notwithstanding this element, the very point is that the price of agricultural land is always lower than the price of urbanized one, so it favors the transformation or rural areas in urban ones.

In some cases the value of external areas is higher because of poor social/environmental performance of urban areas, so people choose to move in the surrounding areas in order to find green areas, lower noise and traffic; this is the case of cities where high-income people live in suburbs.

A different approach to urban sprawl is carried by positional economics, based on the work of Fred Hirsch. He introduced the concept of social limit of the growth, pointing out that "as the level of average consumption rises, an increasing portion of consumption takes on a social as well as an individual aspect. That is to say, the satisfaction that individuals derive from goods and services depends in increasing measure not only on their own consumption but on consumption by others as well". It

means that when population becomes richer, some goods acquire a social status value. It is a concept that overcomes the classical idea of positive marginal utility based on individual preferences. In the positional economics, relative consumptions count too, so social aspects influence the utility of goods. This theory expects that when population income arises, the consumption of goods that have a social status become more important, and accommodation are considered, in the western society, a positional good, because house represents and symbolizes living condition of people. Frank (Frank, 2005) reports two experiments "In each, you must choose between two worlds that are identical in every respect except one. The first choice is between world A, in which you will live in a 4,000 square-foot house and others will live in 6,000 square-foot houses; and world B, in which you will live in a 3,000-square-foot house, others in 2,000-square-foot houses. Once you choose, your position on the local housing scale will persist. If only absolute consumption mattered, A would be clearly better. Yet most people say they would pick B, where their absolute house size is smaller but their relative house size is larger. Even those who say they would pick A seem to recognize why someone might be more satisfied with a 3,000-square-foot house in B than with a substantially larger house in A.". But it does not happen for every goods. For example, Frank states that the number of days of vacation is not a positional good. Frank defines positional goods, the ones in which the surrounding context defines the preferences.

Similar conclusions are found by Luttmer (Luttmer, 2005). He found that higher earnings of neighbors are associated with lower levels of self-reported happiness. He defined the happiness related to the income as an interpersonal preference, based on utility functions that depend on relative consumption in addition to absolute consumption. Furthermore Luttmer found "evidence that the results are stronger for people who socialize more with neighbors but not for those who socialize more with friends outside the neighborhood." (Luttmer, 2005).

The negative effects of urban sprawl

The European Environment Agency recognizes urban sprawl as a critical factor, because it increases land consumption, energy consumption, greenhouses emissions threatening both the natural and rural environments. Urban sprawl "produces many adverse impacts that have direct effects on the quality of life for people living in cities." (European Environment Agency, 2006 p.6).

Urban sprawl produces critical impacts, beyond the directly exploitation of land. Land and soil are not renewable resources and urbanization is not a reversible process. Urban sprawl is associated to higher consumption of raw materials and transformation of soil properties. Only in German, sealed areas grow about 15 m^2 every second. It produces a loss of water permeability (reducing water sources) and biodiversity. Thus rainfalls on sealed areas are polluted, due to tire abrasions and presence of heavy metals. This pollutes rivers and other water sources, reducing the quality of water and, in turn, ecosystems.

Environmental effects are also related to the changes of life-style, due to urban sprawl. For instance, households living in detached houses consume more water and more energy and require more energy and material. Transport systems consume more energy, because sprawl areas are dominated by car and average distance of movements increase: cost transport in high density areas is half than in low-density ones (European Environment Agency, 2006 p.30).

Natural and protected areas suffer from urban sprawl, even when they are not very closed, due to the fragmentation of ecosystems. "the indirect fragmentation impacts of transport and other urban-related infrastructure developments create barrier effects that degrade the ecological functions of natural habitats" and "Urban land fragmentation, with the disruption of migration corridors for wildlife species, isolates these populations and can reduce natural habitats" (European Environment

Agency, 2006 p.31).

Rural areas are probably the most suffering ones, because there is a direct competition between agricultural and urban uses. Agricultural use suffers for the increasing price of land, because farmers can capitalize the real estate value of land. Even when agricultural areas resist, proximity to urban areas reduce quality of soil and reduce the value of agricultural uses.

But urban sprawl generates social problems too. First of all, there is a segregation of people, according to personal income. The report of EEA states clearly that "The socio-economic character of suburban and peripheral areas is typified by middle and upper income families with children, who have the necessary mobility and lifestyle to enable them to function effectively in these localities" (European Environment Agency, 2006 p.35), and this effect is in some case so evident that the concept of "dual city" has been applied to describe socio-economical differences between inner and suburban areas. "In the inner city, poor quality neighborhoods often house a mix of unemployed people, the elderly poor, single young people and minority ethnic groups, often suffering from the impacts of the selective nature of migration and employment loss." (European Environment Agency, 2006 p.36). Cervero (Cervero, 1996) suggests that car-dependent access to job-location has increased urban poverty, because low-income households spend up to 20% on transport, and/or commute 3-4 hours every day, reducing time availability for social, personal and recreational activities. Actually, in some cases the divided city occurs in the opposite way, where high income people reside in the inner part and suburbs are more based on low-income people. Notwithstanding the direction, the dual-city phenomenon occurs in almost all urban areas where urban sprawl happens, and this reduces quality of life, creating social problems.

This short presentation has showed the critical role of urban sprawl in influencing environmental and social factors. Urban sprawl is a complex

phenomenon that can be tackled only through active policies, because urban sprawl is a self-enforcing process. Urban sprawl favors diffusion of cars, increase distances and need of new transport infrastructures, and reduce value of rural areas. This creates again more pressure and need of new urban developments that replicate the same phenomenon.

This is the reason because, active policies are required, and simply market forces are not enough to tackle this phenomenon, as suggested by EEA and EU Commission.

Next paragraph presents main drivers and causes that generate urban sprawl. It represents the theoretical background needed to define policies to tackle this phenomenon.

Drivers of urban sprawl

Literature on urban sprawl has been developed over many years. This permits to define a framework including the most important causes that facilitate urban sprawl. Actually, there is a circular relation between drivers of urban sprawl and urban sprawl itself. It is true that some economical and social factors encourage sprawling, but it is also true that urban sprawl strengthens those factors, so relations should not be considered one-way but mutual reinforcing. It is reason because there is need of active policies to tackle this phenomenon.

Saelens et al (Saelens, Sallis, & Frank, 2003) define two fundamentals factors influencing the choice to use motorized or non-motorized transport: **proximity** and **connectivity**.

Proximity relates to the physical distance between trip origin and destination (more proximity means shorter distance). It depends, positively, on two main variables: the **density** of urbanization and **land use mix**. Both of these variables are

positively correlated with the use of non-motorized transport. It is more likely to happen that more density areas permit shorter trips in order to get to destination; it is a condition to encourage non-motorized movements. Walking distance is considered up to 2km, whereas cycling distance is considered up to 5 km[8]; within this distance, people consider the chance of non-motorized movements. Land use mix encourages non motorized transport for different reasons. First of all, it shortens average trip distance, because it allows people to have closer commercial and working areas. Like in older cities, the presence of street-level shops makes easier to walk up to shopping areas and creates more vibrant and amiable quartiers. It is consistent with Handy's main findings "utilitarian trips (e.g., to go shopping) are the source of overall differences in walking trips between high- and low- walkable neighborhoods because walking for exercise did not differ between high- and low-walkable neighborhoods" (Saelens, Sallis, & Frank, 2003 p.83).

Connectivity is the second fundamental factor that promotes non-motorized movements. It refers to the ease of movements between origin and destination points. It is influenced by the existence of barriers, transport infrastructures, amenity of paths, urban design, feeling of safety and security and many other elements. In general term, "low connectivity is found in the layout of modern suburbs and is characterized by a low density of intersections (e.g., long block size), barriers to direct travel (e.g., cul de sacs), and few route choices" (Saelens et al., 2003 p.82), instead "connectivity is high when streets are laid out in a grid pattern and there are few barriers (e.g., walls, freeways) to direct travel between origins and destinations. With high connectivity, route distance is similar to straight-line distance" (Saelens et al., 2003 p.82). The following picture shows different urban designs. The upper part represents a stereotype of new low-density urban designs, whereas the lower part

[8] Readers should not forget that proximity is not the only factor influencing modal trips, but also connectivity is important.

represents traditional high-density areas. In the upper part, connectivity is limited by the existence of barriers, so, also when proximity is similar, the existence of barriers influence greatly transport modes.

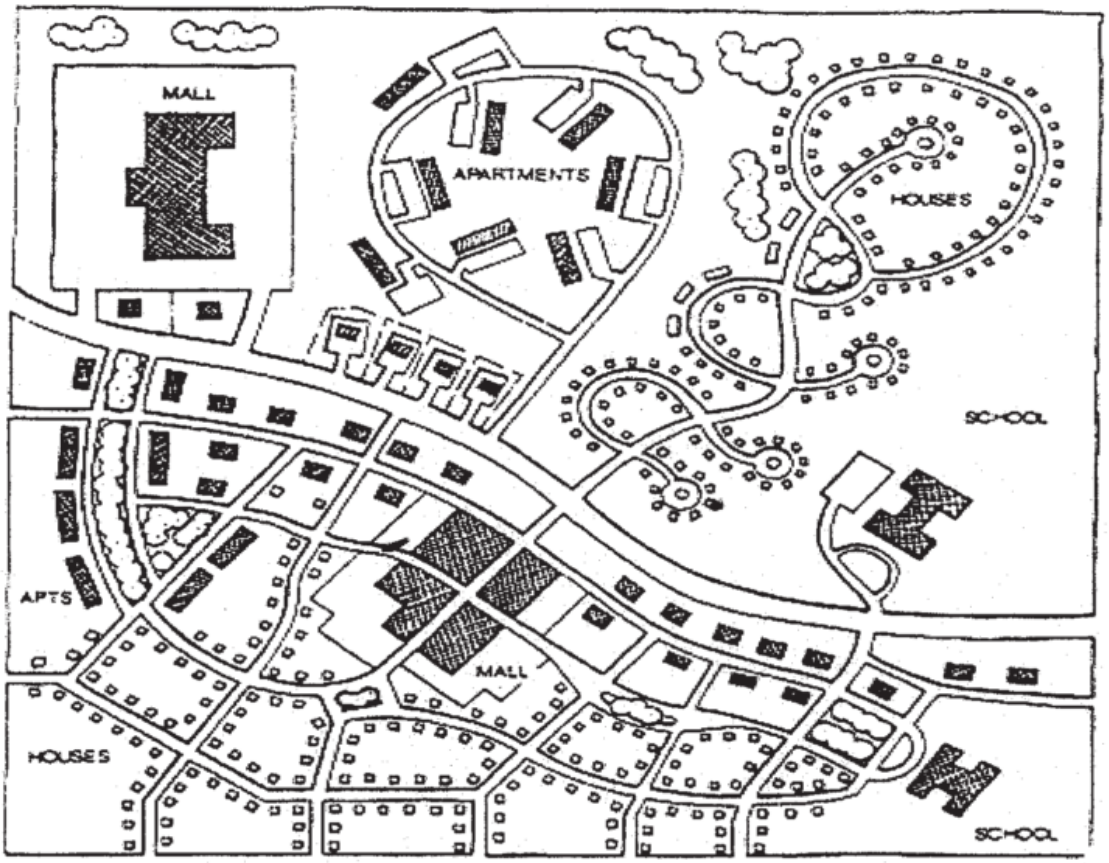


Figure 1Two different urban designs in (Saelens, et al., 2003). Copyright 1989 by the Institute for Transportation Engineers.

Connectivity depends on different kinds of barriers. Highways or other major transport infrastructures create an unpleasant and uncomfortable context that reduces the chance of using non-motorized transport. Hence, connectivity refers not only to the trip distance, but the quality of the trip itself. Walking 1 km in a vibrant and pleasant area, it is not same of walking one minute on a sideway of a polluted street.

The first part of this paragraph shows which factors influence the choice

between motorized and non motorized movements. It concludes that proximity and connectivity are the most important ones, and that other factors, such as travel cost, environmental quality, and aspects of convenience and access (e.g., parking availability) are also likely influential. After, it concludes that proximity and connectivity depend on density, land use mix and urban design.

It is now possible to make one step more and analyzing which factors influence the density, land use mix and urban design choice. There are many different drivers influencing these processes.

Land price and regulations are a critical factor influencing this process. Rural areas have lower price than urban areas, due to the availability of more space. It encourages urbanization of new areas, in order to accomplish need of new accommodations. At the same time, weak land use planning and poor enforcements of existing plans do not permit to tackle urban sprawl. On the contrary, "competition among municipalities for new income generating jobs and services is great, and many municipalities can be tempted to relax controls on the development of agricultural land and even offer tax benefits to commercial and industrial enterprises to invest in the municipality. Competition of this nature between municipalities fuels urban sprawl." (European Environment Agency, 2006 p.20). The combination of lack of regulation and price land fuel urban sprawl.

Social factors are fuelling urban sprawl too. "Families with small children are most likely to move to suburban areas and to rural areas outside the city. In contrast the elderly and single are least likely to move out of cities." (European Environment Agency, 2006 p.20). At the same time, smaller families create pressure for new accommodations. These phenomena are working in opposite direction: it is expected that growing quota of elderly people will reduce pressure on urban sprawl, but in the same time, reduction of average number of people living in household is fuelling urban sprawl. Other social factors are related to new life-style and values. Perception

of safety and security is higher in suburbs, where criminality and pollution is considered less dangerous. The EEA report states that "city cores are perceived by many as more polluted, noisy and unsafe than the suburbs. The built-up environment is also considered unattractive because of poor urban planning, with areas lacking green open space and sports facilities. Unemployment, poverty, single parent households, drug abuse and minorities with integration problems are also often identified with inner-city areas" and "More and more people in Europe regard a new house, ideally a semi-detached or detached house in the suburban/rural areas outside the city, as the prime investment to be made in their lifetimes" (European Environment Agency, 2006 p.20). More in general, tendency toward more individual life-style promotes values that boost urban sprawl. Instead high-density city life is much more related with sense of community and sharing values.

There are also transport related factors that fuel urban sprawl. First of all, increasing availability of roads and cars create powerful incentive to urban sprawl. For instance, EEA warns EU Commission that "given the powerful influence that new transport links have in generating development it is vital that current TEN plans fully address all possible impacts of the new infrastructure provision on urban sprawl and on the natural environment." (European Environment Agency, 2006 p.18). And urban sprawl does not fit with public transport systems and generates need for more cars, so it represents a self-enforcing effect. There are also other transport related effects less evident. For instance, there is a great confidence that more car efficiency can reduce environmental problems, like reduction of greenhouses gases. But in turn, if more car efficiency allows more cheap movements, the effects could be in the opposite direction, where the increasing use of cars, due to the reduction of cost movement, can be bigger than the reduction of fuel due to improved engine

efficiency[9]. This point is supported by EEA too "When travel costs fall below a certain threshold and income reaches a certain level the rate of sprawl quickens, and unsurprisingly sprawl is more common in regions where incomes are high and commuting costs are low" (European Environment Agency, 2006 p.18).

It is almost impossible to shape all relations and feedbacks between different drivers and effects, due to the complexity of relations and the involvement of many different economical, social and environmental factors. Anyway, without any presumption to be exhaustive, it is useful to present some models that could help to summarize concepts reported in this paragraph. For instance, Saelens and al. propose the following scheme to relate neighborhood environment, individual factors and non-motorized transport purpose (Saelens et al., 2003 p.88).

[9] This is the well-known concept of elasticity of demand respect to the price

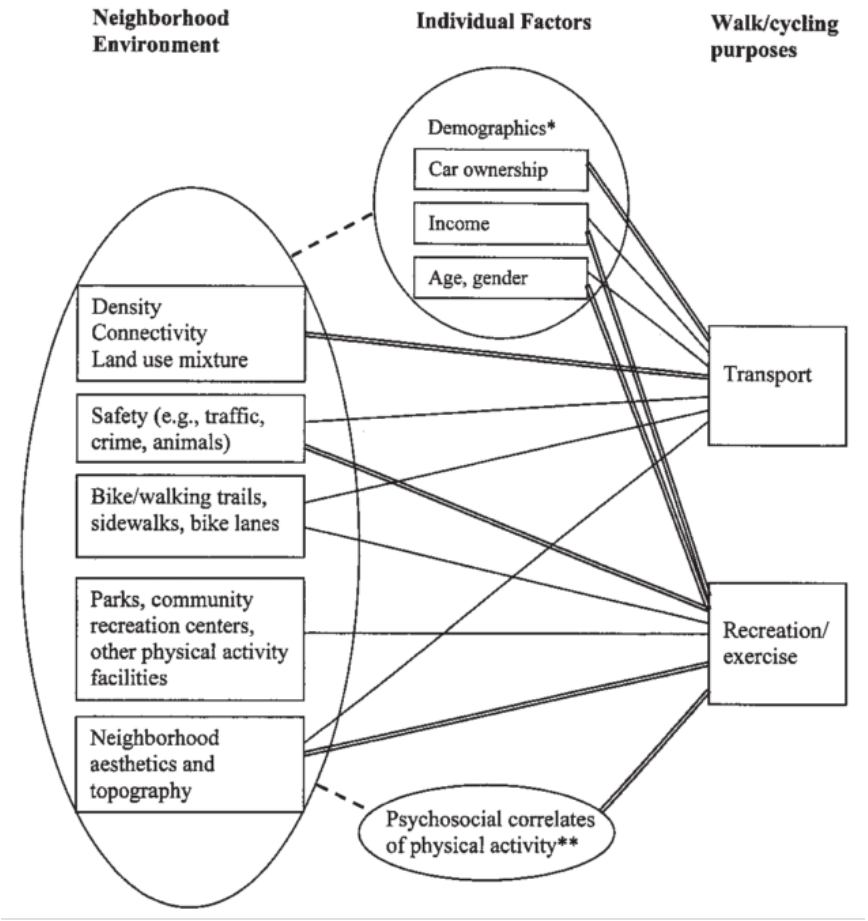


Figure 2 A model of neighborhood environment influence on walking and cycling in (Saelens et al., 2003). *Double lines denote stronger relations*

The EEA does not present a model, but only drivers that influence urban sprawl (European Environment Agency, 2006 p.17)

Macro-economic factors	**Micro-economic factors**
Economic growth, Globalisation, European integration	Rising living standards, Price of land, Availability of cheap agricultural land, Competition between municipalities

Demographic factors Population growth, Increase in household formation,	**Housing preferences** More space per person, Housing preferences
Inner city problems Poor air quality, Noise, Small apartments, Unsafe environments, Social problems, Lack of green open space, Poor quality of schools	**Transportation** Private car ownership, Availability of roads, Low cost of fuel, Poor public transport
Regulatory frameworks Weak land use planning, Poor enforcement of existing plans, Lack of horizontal and vertical coordination and collaboration	

Table 1 Urban sprawl drivers in (European Environment Agency, 2006)

The paragraph shows the drivers related to urban sprawl, and how they rely on environmental, political, social and economical factors. In order to tackle urban sprawl, there is a need of policies that overturn current trends. This requires not only different political instruments, but a change in social and political values and beliefs, that Fiorino has defined as social learning (Fiorino, 2001). Next paragraph addresses the actual political commitment toward urban sprawl and the following one points out conceptual changes required to overturn actual urban sprawl trends.

The lack of EU political commitment

Increasing attention occurs on impacts of transport policies on environment, but political agenda focuses mainly on greenhouses emissions and efficiency. European Commission defines long-term strategies and European objectives for the

transport sector. Here the focus is almost on energy consumption and greenhouse emissions. For instance, EU Department of transport and mobility defines following transport policies aim "at fostering clean, safe and efficient travel throughout Europe"[10]. Commission services are currently preparing the new transport White Paper. Its adoption is foreseen for early 2011. In the meanwhile, European strategy is defined by the publication "A sustainable future for transport". Commissioner for transport, Antonio Tajani, states that "science is urging us to drastically reduce our greenhouse gas emissions, growing demand and declining production are pushing oil prices to unprecedented heights, and congestion is approaching intolerable levels in many cities, airports and ports. The scope of these challenges is such that a profound transformation in the transport system will be required in the coming decades". He focuses on greenhouses emissions like the most critical problem to address. The report reports that progress has been achieved in reducing air pollution and road accidents, but the expansion of transport infrastructure has also resulted in habitat loss and landscape fragmentation. Notwithstanding that, "environment remains the main policy area where further improvements are necessary" in term of reduction of greenhouses emissions.

In the report, urbanisation is considered a constant trend over the last 50 years, but it is considered through its negative effects in term of greenhouse emissions, higher travelling costs and public acceptance of new infrastructures. The chapter four addresses policy objectives and again environmental focus is on reduction of greenhouses emissions. Planning and accessibility are considered strategic policies in order to reduce the need and length of movements. This is considered a policy to challenge urban congestion, with no broader references to land consumption and quality of urban living.

[10] http://ec.europa.eu/transport/index_en.htm

The same report of European Environmental Agency on urban sprawl defines this phenomenon like the "ignored challenge" (European Environment Agency, 2006) and realizes that "EU Cohesion and Structural Funds….can also create inadvertent socio-economic effects that have promoted the development of sprawl" and it suggests that "The coordination of land use policies and Structural and Cohesion Funds investments remains key to support the containment of urban sprawl" (European Environment Agency, 2006 p.7). So EEA states clearly that "the EU has an obligation in relation to the wide range of environmental, social and economic impacts of urban sprawl to define a clear and substantial responsibility, and a mandate to take an active lead in the development of new initiatives to counter the impacts of sprawl." (European Environment Agency, 2006 p.7). But political agenda is not oriented toward this issue. For instance, in April 2004, European Parliament and the Council identified 30 priority projects that include 12.000 km of new highways, for 220 million of EUR. Importance of political commitment is also supported by the fact that "Clusters of compact cities are also evident in the former socialist countries of central and eastern Europe. The compact urban form and high densities mainly reflect the strong centralised planning regimes" (European Environment Agency, 2006 p.15). Compact forms are present in cities with a long urban tradition too.

It is not worth mentioning more examples, because the picture is clear: while urban sprawl is a critical factor and it is recognized unanimously by transport experts and environmental agencies, there is a lack of political focus on this topic, at least at EU level, where political coordination should occur. It means that, even if some local communities are trying to tackle this problem, there is a need of changes in political approach and values, in order to give priority to actions against urban sprawl. Next paragraph reports how these changes should modify the approach to the problem.

Changing transport and land development approach and paradigm

The clearest statement about the need of changing paradigm has been made by Cervero "In the industrialized world, the automobile has become the defining technology of built environments. It sets the form and shape of cities. It dictates the scale of streets, the relationships between buildings, the vast amounts of land devoted to parking, and the pace at which people experience urban life. It dominates what were one colorful streets shared by pedestrians, cyclists, trolleys and the community at large. And it segregates cultures, old from young, home from job and store, rich from poor" (Cervero, 1996 p.1). Cervero considers these effects the result of car-based dominant transport planning. So, he states "Do we have the wrong objective function?" and "shouldn't we be planning for accessibility, not automobility?". It represents the fundamental paradigmatic shift in transport and land development approach. Policies should focus on people and places, not on car or transport performance. Similar concept is expressed, using a more conceptual approach, by Burkhardt and Shaffer (Burkhardt & Shaffer, 1972) when they define differences between outputs and impacts. Former refers to results directly related to the functional nature of the program "transportation improvement project outputs are those changes in traffic flow-in all its various metrics: speed, volume, travel time, trip distance, etc.-that result from the improvements." (Burkhardt & Shaffer, 1972 p.208). Instead impacts refer to "by-products of the improvement process and the improvement itself. Transportation project impacts include economic, physical, social, psychological, and environmental changes in neighborhoods or other areas and in the people who live or interact there." (Burkhardt & Shaffer, 1972 p.208). They state that transport impacts "have only come to be included in program evaluation in recent times. This is for several reasons. First, some impacts must be called unintended, since they have not been expected and are sometimes distinctly negative" (Burkhardt & Shaffer, 1972 p.208).

Cervero states that automobile planning works on the supply side, aiming to increase offer of infrastructures and better transport performance, instead accessibility planning emphasizes on demand management, in order to avoid or minimize motorized transports. Same concept is expressed, 30 years later, by the EEA "New policy interventions to counter sprawl could be focused on the need to supplement the logic of the market and be based on demand-driven rather than supply-driven management" (European Environment Agency, 2006 p.38), showing that there is a wide agreements on this topics. But like a previous paragraph shows, there are specific drivers that fuel urban sprawl, so the focus is obviously not on the car itself. Like Cervero states "blame the automobile for urban sprawl…is a bit unfair. After all, the automobile is both figuratively and literally a vehicle, a means to an end. It is the values and aspirations…to live in low-density settings and separate home and work that has given rise to sprawl…not the car *per se*." (Cervero, 1996 p.6). So what is important is build compact and vibrant area, that are culturally more diverse and carry a sense of community "an attachment to place and a milieu where people come into regular contact rather than being confined to their cars and homes" (Cervero, 1996 p.9). At the same time, EEA states that "planning policy solutions at all levels of governance more typically reflect the logic of economic development rather than a sustainable vision of urban Europe" (European Environment Agency, 2006 p.38). There is a continuum between the conflict between individual achievements and group solidarity at individual level, and relations between city and wider regional context at aggregate level. As the first relation fuels urban sprawl, so the latter does the same, because "the responsibility for land use management remains divided between different administrations and this fragmentation of management, frequently exacerbated by the political tensions of neighboring administrations, may lead to incoherent and uncoordinated land use management." (European Environment Agency, 2006 p.40).

Cervero reports a comparison between different policies under these two different paradigms.

Automobility Planning	**Accessibility Planning**
Road construction/expansion • Motorways/Freeways • Beltways • Interchanges/Rotatories • Hierarchical networks • Arterial expansion	Land use management/initiatives • Compact development • Mixed uses • Pedestrian oriented design • Transit villages • Traditional neighborhoods/ new urbanism

Table 2Transportation mitigation approaches under different planning paradigms in (Cervero, 1996)

The Table 2Transportation mitigation approaches under different planning paradigms in should be considered an example of different policies. More than the specific content, it is important to focus on different approaches between the two paradigms. Some further consideration could be done. First, it is interesting to notice how, after 30 years, ITS is still considered a factor increasing urban sprawl, because EEA supports similar position "Overall, it is likely that ICT will drive urban development towards an even more sprawled future" (European Environment Agency, 2006 p.17). It is quite in contradiction with the idea that smart and high-technological transport system should create benefits for the environment, because they will save fuel (see for instance (European Commission, 2009). The misunderstanding happens because it is true that efficiency will lead toward reduction of fuel consumption, but it is true only in a short term perspective. ITS long term effects are more likely to encourage the use of car and, in turn, the urban sprawl. It is

the reason because ITS policies are considered more a problem, than a solution. Second, heavy public transport infrastructures are considered "automobility oriented". In order to understand this point, it is important to realize that focus here is not only on reduction of greenhouses emission, or only on reduction of car-private trips, but focus involves an overall overturn of paradigm, where the approach is on livability areas, with human-dimension infrastructures and reduction of number and average distance of movements. Mass transits systems are neither people nor place oriented, but they are always commuting oriented, even if with a (positive) focus on public transport instead that car. The concept is well express by "New Urbanism" movement which aim is "promotes the creation and restoration of diverse, walkable, compact, vibrant, mixed-use communities composed of the same components as conventional development, but assembled in a more integrated fashion, in the form of complete communities. These contain housing, work places, shops, entertainment, schools, parks, and civic facilities essential to the daily lives of the residents, all within easy walking distance of each other."[11].

This chapter has addressed following aspects:

- Why urban sprawl matter
- Which are the drivers that influence urban sprawl
- The actual lack of commitment and focus on the political agenda
- The paradigm and theoretical framework that could tackle urban sprawl

The actual chapter does not focus on policy making process and how the actual governance model could change in order to tackle urban sprawl. It is the content of the next chapter, that chapter focuses on environmental policy integration. It is an approach that could lead to change the policy making process toward objectives and

[11] More information on http://www.newurbanism.org/

aims pointed out in this chapter.

Environmental policy integration: an approach to tackle urban sprawl

Close coordination between different policies and initiatives, and better cooperation between different levels of administration are required to define policies able to tackle urban sprawl. Environmental problems do not require only "end pipe" solutions but need to be integrated in the whole process of policy making.

The role of integration policies, with a specific focus on environmental integration policy (EPI) is already well defined in EU policies. This change in approach is clearly stated by the European Commission "In the early days of environmental policy, three to four decades ago, the environmental problems being addressed were typically releases of dangerous or polluting substances into water, air or soil, causing acute and severe problems in the immediate vicinity of the source" but now, environmental policies are shifting toward a more integrative approach because "It recognises that the sources of environmental problems need to be addressed at a structural level – and at the point where decisions are taken. In other words, integration means that everyone must take environmental considerations into account just as they take account of economic and social aspects" (Commission, 2002 p.6).

The concept of EPI

EPI has been widely discussed among researchers (Lafferty & Hovden, 2003). This discussion has produced many different positions and views, so it is hard trying to give an overall overview about all concepts embedded in those discussions. Hence, this paragraph focuses only EPI elements used for the case study's analysis. Policy integration is "a term used to describe the incorporation of specific public policy objectives, for instance environmental protection, into other public policies" (Mickwitz & Kivimaa, 2007). It relies on the idea that the "environmental sector

alone will not be able to secure environmental objectives, and that each sector must therefore take on board environmental policy objectives if these are to be achieved" (Lafferty & Hovden, 2003). The connection with the concept of sustainable development is quite strong, because it requires the integration of sustainability within other policies. Lafferty and Hovden consider integration the most important general environmental policy axiom of the 1980s and 1990s, and a central element of the concept of 'sustainable development'.

Underdal defines an integrated policy as 'one where all significant consequences of policy decisions are recognized as decision premises, where policy options are evaluated on the basis of their effects on some aggregate measure of utility, and where the different policy elements are consistent with each other" (in Lafferty & Hovden, 2003). This definition of policy integration should be adapted to the environmental sectors. It is not only a matter of sectorial integration, but when attention shift to environment, there are also normative implications.

EPI has been defined by Lafferty and Hovden (Lafferty & Hovden, 2003 p.9) as:

- the incorporation of environmental objectives into all stages of policy-making in non-environmental policy sectors, with a specific recognition of this goal as a guiding principle for the planning and execution of policy;
- accompanied by an attempt to aggregate presumed environmental consequences into an overall evaluation of policy, and a commitment to minimize contradictions between environmental and sectorial policies by giving principled priority to the former over the latter.

There are two important elements in this definition. First, there is no explicit recall to the concept of sustainable development, so "It refers to the general category

of 'environmental objectives', which could be sustainable development or any other desired environmental policy discourse" (Lafferty & Hovden, 2003 p.9), even if authors affirm that sustainable development explicitly calls for EPI.

Second, environmental policies should have principled priority. Normative value is explicitly declared by the authors "We would argue that the whole point of EPI is, at the very least, to avoid situations where environmental degradation becomes subsidiary" (Lafferty & Hovden, 2003 p.9).

The normative aspect becomes important when EPI addresses "win-lose" situation. When EPI is framed like "win-win" opportunities, normative problems may not happen, but when conflicting interests arise, there is a need of addressing priorities. According to Lafferty and Hovden, EPI should give priority to environmental objectives. It "should not be taken to mean that environmental objectives should, in every case, override other developmental goals and priorities" (Lafferty & Hovden, 2003 p.10), because policy priorities are a democratic process, and even the Brundtland Report states that ecosystems cannot be preserved intact. So, Lafferty and Hovden's position is not in favor of an "extra-democratic" prioritization of environmental objectives, but they argue that environmental effects should always be assessed, in any relevant policies. They recall the example of economic policy that has a principled priority because "The objectives of economic policy are implicitly or explicitly infused in virtually every other policy sector…. However, even though economic policy has a commanding position among a variety of societal objectives, it does not mean that considerations of economic policy always prevail." (Lafferty & Hovden, 2003 p.10).

Lafferty and Hovden define EPI in term of objectives, as Underdal does in term of consequences. Actually there is a debate about what should be integrated in EPI (Persson, 2007). Mainstream positions, as Lafferty, Hovden and Underdal showed, focus on environmental objectives, because it helps to reduce conceptual complexity.

Other authors, like Liberatore, focus on actors, time and space. This project relies on the former interpretation, so EPI is analyzed in term of environmental objects, but it is clear that different perspectives can be applied. Under this perspective, the analysis of actors, institutions and structures is important to explain how integration takes place. In evolutionary term, the distinction between means and ends (what and how) is somewhat complex, due to mutual feedbacks and relations. But it is clear that this distinction may help reducing conceptual complexity.

The focus on integration of policy objectives means that political **strategies**, **instruments** and **outcomes** should be modified. Mickwitz and Kivimaa define the following model of dealing with changes required by EPI

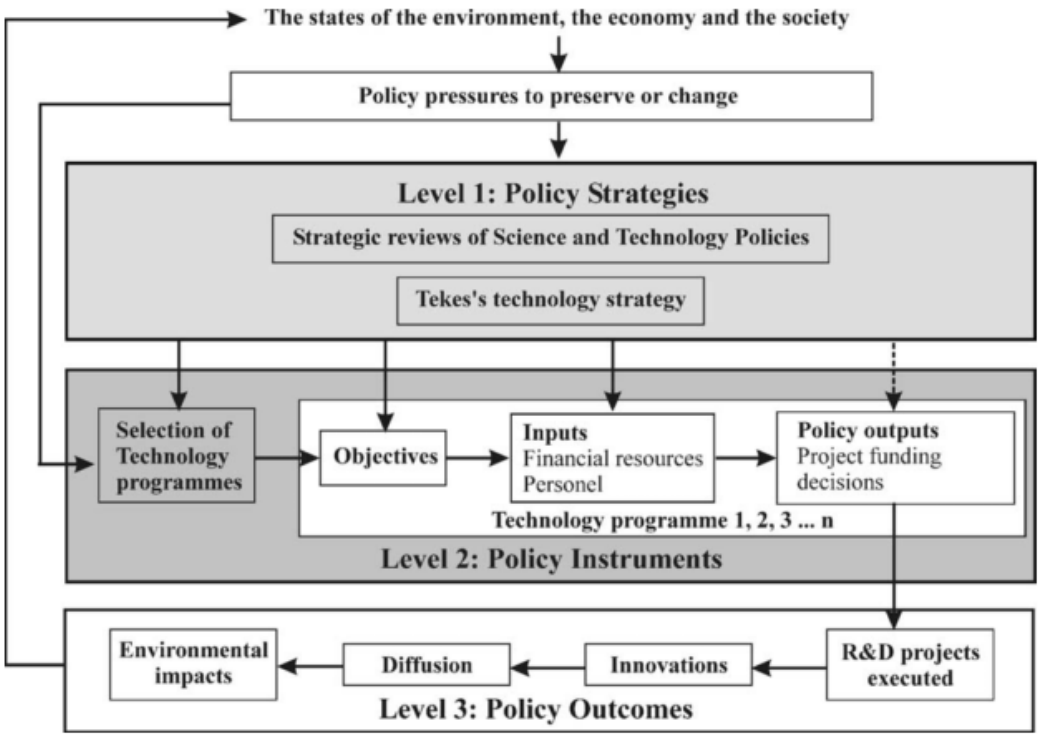


Figure 3 Source (Kivimaa & Mickwitz, 2006)

Policy strategies should be evaluated "by examining the contents of the strategy documents produced and policy inputs, such as people and financial resources allotted to environmental issues.", instead policy instruments focuses "on the objectives of different technology programmes and on the allocation of financial

resources to different types of programmes." (Kivimaa & Mickwitz, 2006 p.733).

Even if there is a common agreement on the idea that environmental objectives should be integrated and policy strategies, instruments and outcomes should be modified, it is possible to define different approaches in order to define key factors and barriers that should be managed. Persson (Persson, 2007) defines four different approaches, not mutually exclusive, based on different assumptions regarding the nature of policy making process: procedural, organizational, normative or reframing approaches.

Procedural approach focuses on changing procedures of policy making process, as including reporting, budgetary process, public process of consultation and involvement or environmental assessment. These are mainly procedural tools focuses on changing organizational routines. Procedures are also referred to rules of decision making, so they could refer about the right to set the political agenda, timing, systems of defining policy proposals and so on. This approach focuses on tools, but lack of normative aspects when trade-offs happen between environmental and other objectives.

Organizational approach focuses on changing organizations, as rearranging departments, creating new bodies, training people or changing public structures missions. It starts from the basic idea that EPI is needed because of sectoral compartmentalization within public bodies. This phenomenon has created competition between sectors, so the idea is to integrate again interests in order to avoid competition, in which environmental interests have usually lower priority than economic ones. Organizational approach focuses also on coordination and communication between sectors and introduces the concept of political power of different sectors and civil servants. The very difference respects to the procedural

approach is that here the focus is on people and power, instead that on routines[12]. There are some risks associated to this approach: oversizing structures could lose efficiency and there could be a phenomenon of dilution of environmental objects within other objectives. It is important that any changes to organizational structures are performed together with a change in missions and aims. Like the procedural one, this approach does not guarantee that normative aspects are considered within the policy making process.

Normative approach focuses on the idea that normative aspects should be prioritize and political will is the critical factor to be changed. It relies on the idea that EPI is possible only when there is a high-political commitment that strengthens environmental aims. Leadership and long-term view are core concepts in this approach, so national long-term strategies and high-level binding objectives are considered important instruments. This should create the right set of incentives to encourage civil servants and bureaucracy to change routines toward a more integrated approach.

The last approach is the reframing one. As the normative one, it focuses on the normative aspects of policy making process. Unlike the normative one, it relies on the concept that changes are possible only if there is a shared commitment of politicians, civil servants and other stakeholders. The core assumption is that EPI should reframe the fundamental perceptions of problems among all stakeholders, involving all of them toward these objectives. This approach realizes the power of lobbies and other stakeholders in encouraging or tackling the effectiveness of policies.

A further point is the criteria of assessment of EPI. Up to now, the analysis focus on which elements should be analyzed and under which paradigms, but nothing

[12] Of course, changin people and structures influence routines too, but the difference is that it is an indirect effect.

has been said about how the analysis should be performed.

Kivimaa and Mickwitz define four criteria to evaluate the degree of integration of policies: **inclusion**, **consistency**, **weighting** and **reporting**.

Inclusion refers "to determine to what degree environmental aspects are covered in policy documents, either in general or by highlighting specific environmental challenges" (Kivimaa & Mickwitz, 2006 p.732). Consistency and weighting refer to the analysis of contradictions and weights given to environmental aspects. Here there is the commitment to reduce "win-lose" situations and to decide which trade-offs are acceptable. These criteria highlight the importance of environmental aspects respect to the others. Reporting is based on the importance of feedbacks and evaluation of data. Other authors (Mickwitz et al., 2009) define a fifth criterion: resources. It focuses on the importance of giving tools and resources, beyond intentions, to the implementation of EPI processes.

A final distinction, widely used, is between **horizontal** and **vertical** integration or between **inter-** and **intra-sectorial**. Previous elements are not bound to any specific governmental level. Instead analysis could be expanded to include concepts related to different levels of government.

Horizontal EPI (HEPI) refers to integration across different sectors, so it includes cross-sectorial strategies, outputs and instruments. Vertical EPI (VEPI) refers to integration within any sectors. VEPI could be defined in two ways: VEPI between different level (as national, regional and local) or VEPI within an level (as between national agencies and ministry).

Many theoretical elements have been showed and one model has been proposed (see Figure 3 Source (Kivimaa & Mickwitz, 2006) . Other models and tools have been defined in order to give more practical instruments in the assessment of EPI. For instance, OECD proposes a checklist on improving policy coherence and

integration for sustainable development. It is based on five criteria and specific following questions[13]:

1. **A common understanding of sustainable development**. Government should ensure that the precise economic, social and environmental realities of sustainable development are properly understood and that their relationship is also understood.
    - What efforts have been made to provide clear, widely accepted and operational objectives and principles for sustainable development?
    - Is the concept of sustainable development sufficiently clear and understood by the public?
    - Is the concept of sustainable development well understood by public organizations and across levels of the government?
    - Are the benefits made evident with clear examples supported by statistics?
2. **Clear commitment and leadership**. Clear government commitment to sustainable development goals, leadership, and communication of this commitment, are essential to support the development of a concrete strategy and subsequent action.
    - Is there a clear commitment at the highest level to the formulation and implementation of sustainable development objectives and strategies?
    - Is this commitment effectively communicated to the various sectors of government machinery and across levels of government?
    - When gaps exist between the administrative and political agendas, are specific efforts made to bridge (or fill) them?

[13] Text in following list is copied by the report

- Is leadership expressed through a sequence of priorities over time?
- Is government maintaining a sense of urgency, despite the longer-term nature of the issues related to sustainable development?
- Are pioneer activities of selected agencies and local communities encouraged, rewarded and disseminated?

3. **Specific institutional mechanisms to steer integration**. Non-environmental policy sectors should be mandated to develop their own sectoral strategies in conformity with overall objectives. This should include a critical evaluation of both the formulation of sectoral strategies and their implementation
    - Is there an institutional "catalyst" (ministry, select committee etc.) in charge of enforcing sustainable development strategies?
    - Is this "catalyst" located strategically within the government machinery (e.g. at the level of the Prime Minister's office)?
    - Are there specific reviews of laws and regulations to check whether they conflict with sustainable development, and are sustainable development objectives embedded in new legislation and regulations?
    - Are there mechanisms to ensure effective feed- back between different levels of government?
    - Are organizations moving from narrow sectoral perspectives (e.g. agriculture, industry, transport etc.) to a more "issues-oriented" agenda (e.g. air quality, mobility, poverty reduction etc.)?
    - Is sustainable development integrated into regular government exercises (e.g. the budget process)?
    - Is there a clear framework for assessing the performance of public organizations with regard to sustainable development?

- Are there evaluation and reporting mechanisms to support sustainability appraisal within the public sector (i.e. indicators of progress, cost/benefit analysis, environmental and social impact assessment)?
- Does government make effective use of these evaluation and reporting mechanisms?
- Have specific external and independent auditing and reporting mechanisms been established?
- Has a body been put in charge of providing guidance to organizations upon request?

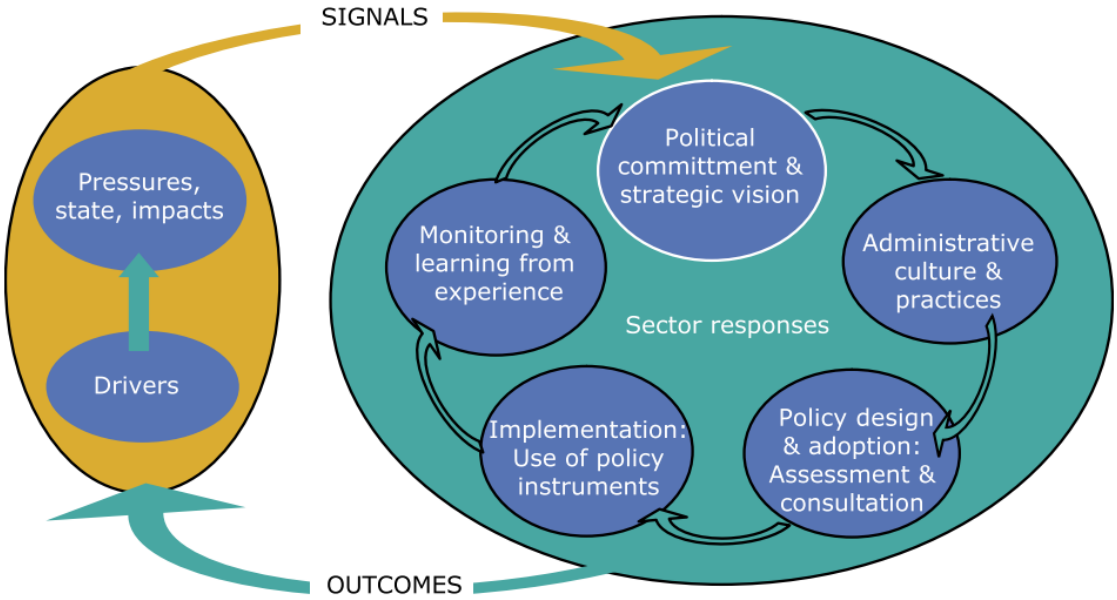
4. **Effective stakeholder involvement.** Business, trade unions, NGOs and citizens' associations should be encouraged to participate actively, and governments have the responsibility to ensure that these consultation and participation processes feed effectively into decision- making processes.
    - Do effective mechanisms exist within government or independent organizations for informing consumers about the consequences of their consumption decisions?
    - Has the legal framework been reviewed and adapted in order to provide clear legal provisions for consultation and participation?
    - Are there clear guidelines on when, with whom, and how consultations should be carried out?
    - Is a case-by-case approach to policy formulation being developed at all levels and on the various dimensions of the issues, and is the public involved in this?
    - Are mechanisms in place for the evaluation of and feedback on consultation, and for monitoring the influence of participation on decision-making?

- Is transparency ensured? For example, has restricted information been made the exception, not the rule, both in principle and in practice?
- Are transparency mechanisms being reinforced at different levels of government for key decisions?

5. **Efficient knowledge management**. Improved scientific input to policy development for sustainability is necessary and requires investment in specific research fields. In addition to improving links between the scientific community and policy-makers, changes in government practices will be require an assessment of possible options before taking decisions.
    - Are the mechanisms transparent, supported by arbitration processes (e.g. a "sustainable development ombudsman"), for managing conflictual knowledge?
    - Does government ensure that a framework is in place to allow discussions to focus constructively on areas of disagreement, by developing scenarios and options?
    - Given that scientific and technological innovation is critical for sustainable development, is sufficient attention devoted to ensuring that the flows of information between the scientific community and decision-makers are efficient and effective?
    - Do research policies encourage and facilitate net- works of scientists and do they support the development of joined-up research between disciplines?
    - Are specific efforts being made to support forward-looking and policy-relevant knowledge, in particular through assuring the right mix between public and privately funded investment in research?

Built on OECD and EEA researching projects, EU (European Environment

Agency, 2005) has defined own framework for the assessment of progress toward EPI oriented policies.



Respect to the OECD list, there are not important differences, so the project does not report the checklist of questions defined by EU.

The presentation of the case study

The city of Århus

Århus is Denmark's second-largest city. About 310.000 people live in the municipality of Århus (469 km^2), of which 250.000 live in the inner area (91km^2). Århus is the largest city of the East Jutland metropolitan area (*Byregion Østjylland*), formed by 17 municipalities in which lives about 1.2 million of people. Nearly 12% of the population of the municipality are immigrants[14]. The largest immigrant groups live mainly in the western/south parts of Aarhus, where the Gellerup area is famous for its high concentration of immigrants (88%, 2006)[14].

Århus is a major center of commerce, industry and higher education and a major university city. The city is growing fast, population was 175.000 in 1970 and 285.000 in 2000 (Attwell & O. M. Jensen, 2002). The population tree shows that the percentage of the 20 to 30 years old is thus very high

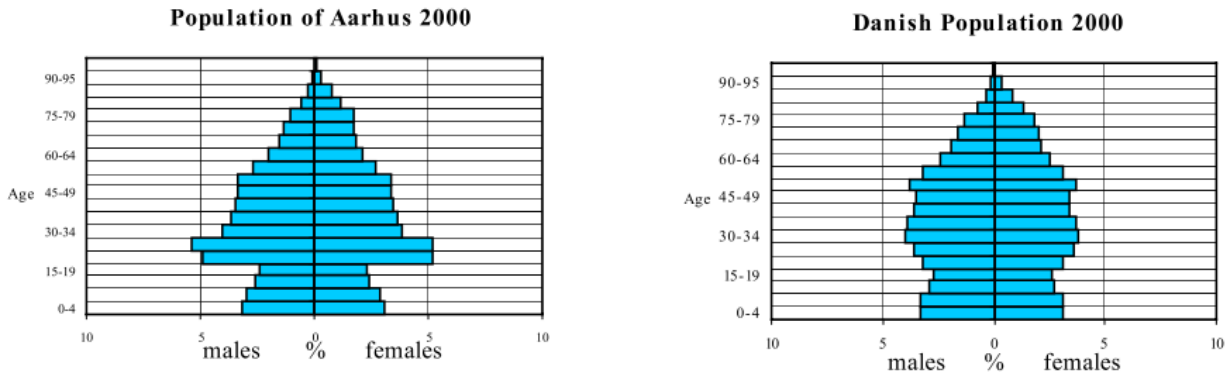


Figure 4 Population trees of Aarhus and of Denmark (Attwell & O. M. Jensen, 2002)

The city council has defined important growing targets up to 2020. The plan estimates 75,000 more inhabitants, 20,000 new homes, 50,000 more jobs and 10,000

[14] http://en.wikipedia.org/wiki/Aarhus#Demographics

more students. Århus is subject to important transformations. The city is changing its economical structure from an industry-based to a knowledge one. The main idea "focusing on the year 2030, is to secure Aarhus' current position as a driver of knowledge-based growth" realizing that "job creation in the city today primarily happens within the IT and knowledge-service industries" (Århus Kommune, 2010).

The transformations of Århus economy, together with the increase of population create high demand for new urban areas. Such demand is planned to be fulfilled through urban transformations of old industrial areas and new urban developments. A number of areas in Aarhus are currently undergoing major changes: Large parts of the port area are being converted into residential, knowledge-based business, cultural and educational buildings. The disused rail freight terminal will be in future house cultural institutions and residential buildings[15]. But also new areas are planned. As Aarhus municipality website states "Rural areas are being transformed into new suburbs in the ambitious project in Lisbjerg, the first of several new urban areas around Aarhus. While suburbs in Denmark are usually dominated by single-family houses scattered over a large area, thus preventing efficient utilisation of intensive public transport, Lisbjerg will be a densely built-up urban area linked to Aarhus's city centre via a light railway."[15].

The city of Århus has defined ambitious environmental targets that influence urban development policies. Among of them, two objectives have a strong and direct impact: Århus wants to be CO^2 neutral by 2030 and wants to preserve the quality of drinking water. These objectives influence in several ways urban policies because they require land too. As environmental department states "Major challenges for the department include converting the open land around the city to achieve a doubling of

[15] See http://www.aarhus.dk/da/sitecore/content/Subsites/CityOfAarhus/Home/activityareas/Urban-and-Business-Development/Urban-Development.aspx

the areas of natural beauty, among other things through comprehensive afforestation which protects the groundwater, increases the recreational value and improves CO2 absorption.". High-density urban areas are considered a way to reduce the use of land and preserve the natural environment needed to achieve such environmental objectives. Such urban policy encourages the use of public transport system. The urban departments states that "The new sustainable urban areas must be densely built-up areas: The light railway is a huge investment requiring a large number of passengers to replace private car use in an economically viable manner. The transition to more public transport is one of the preconditions for reaching the ambitious climate goals. Fewer and more densely built-up urban areas also have a positive impact on the groundwater and make the city more lively in the daytime."[15].

Social aspects influence the urban development policies too. Due to the high presence of immigrants, the city of Århus is dealing with integration problems that arise when different cultures are separated. This is the idea behind Gellerup´s project of urban transformation[16] and, in a smaller scale, Viby syd[17]´s project too. This is based on the idea that when neighborhoods are physically closed around themselves and only provides housing, there is greater risk that they end up as ghettos; instead urban areas must be an integrated in the city. Important changes require urban transformations too, so the current neighborhood will be converted into a diverse one, with a new high street, new types of housing, shops and workplaces.

The urban planning process has been influenced not only by local objectives and dynamics, but by national changes too. Denmark's reform of local government structure in 2007 delegated responsibility for comprehensive spatial planning for both town and country to the municipalities (Danish Ministry of the Environment, 2007).

[16] http://www.helhedsplangellerup.dk/da.aspx
[17] http://www.vibysyd.dk/aktuelt/helhedsplaner/

The reform abolished the counties and created five popularly elected regional councils. The former 271 municipalities have merged into 98 municipalities and the Planning Act now delegates responsibility for spatial planning to the Minister for the Environment, five regional councils and 98 municipal councils.

The brief presentation of the city wants to highlight economical, environmental, social and institutional factors and trends that are influencing the urban planning process and create the framework in which such process is analyzed. Next paragraph describes the institutional organization of Århus municipality, and the interviews made for the analysis of the case study.

Presentation of Århus bureaucratic organization

The City of Aarhus is run by a city executive board. It consists of the mayor and five full-time aldermen that head municipal departments. The five aldermen have the political and administrative responsibility for the own municipal department and are appointed on the basis of the share of votes obtained by each party in the city council election, so political disagreements can arise among them and with the Mayor[18].

The municipality of Århus is divided in a Mayor´s office and the following five departments:

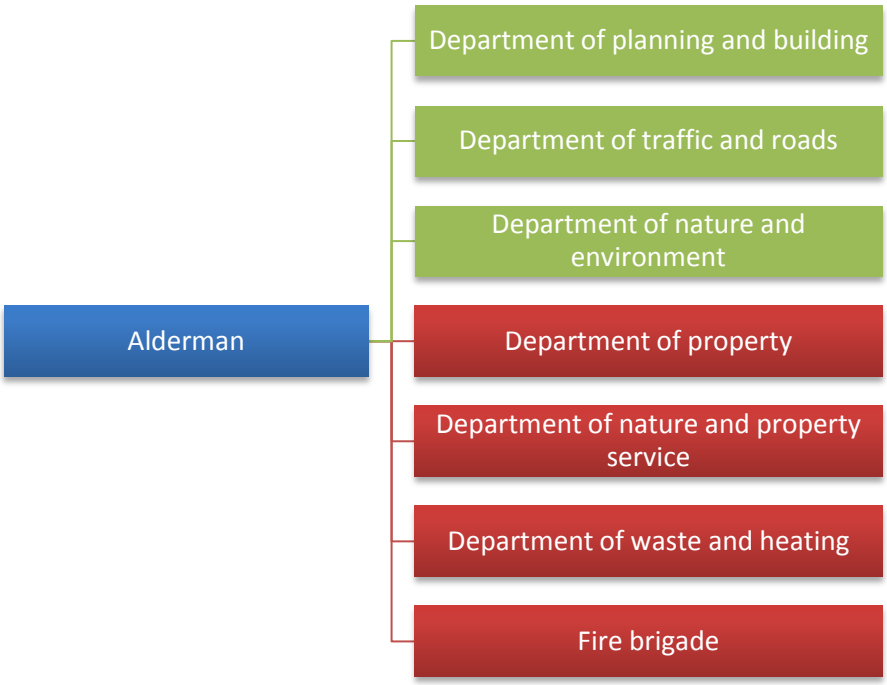
1. Department of Social Affairs and Employment, with 4,500 employees
2. Department of Technical Services and Environment, with 1,400 employees.
3. Department of Culture and Citizens' Services, with 750 employees.
4. Department of Health and Care, with 7,000 employees.
5. Department for Children and Young People, with 15,000 employees.

[18] http://www.aarhus.dk/da/sitecore/content/Subsites/CityOfAarhus/Home/The-Organization.aspx

For the purpose of the case study, I have contacted the Mayor´s office and both and the Social Affairs and Employment one, but I have received contacts and performed interviews only about the first two institutional bodies.

Among other things, the Mayor's office is in charge of important urban development projects and integration, whilst the Department of Technical Services and Environment covers a wide range of areas relating to urban development, environment, infrastructure and nature.

The Department of Technical Services and Environment is organized as follows (in green departments that have been interviewed)



The department of planning and building has the responsibility for physical planning in the municipality, using the local plan (Kommuneplanen) as primary tool. The department employs about 150 people.

The department of traffic and roads has 4 branches: Planning, Construction, Operations and Public Transport. Planning is responsible for traffic planning and plans for traffic infrastructure in the Municipality of Aarhus. The department employs

about 100 people.

The department of nature and nature has the responsibility for landscape and recreational areas. Specific tasks include nature conservation, supervision of enterprises and agriculture, soil contamination, use of parks, forests and cemeteries. The department employs about 100 people.

Interview with Jette Bøjesen

Jette Bøjesen works at the branch of Urban Renewal and General Construction (*Alment Byggeri og Byfornyelse*) in the department of planning and building and she is the personal assistant of the City Architect of Århus (Stadsarkitekt) Gøsta Knudsen. Since 2007, she was involved with the Gellerup project of urban transformation.

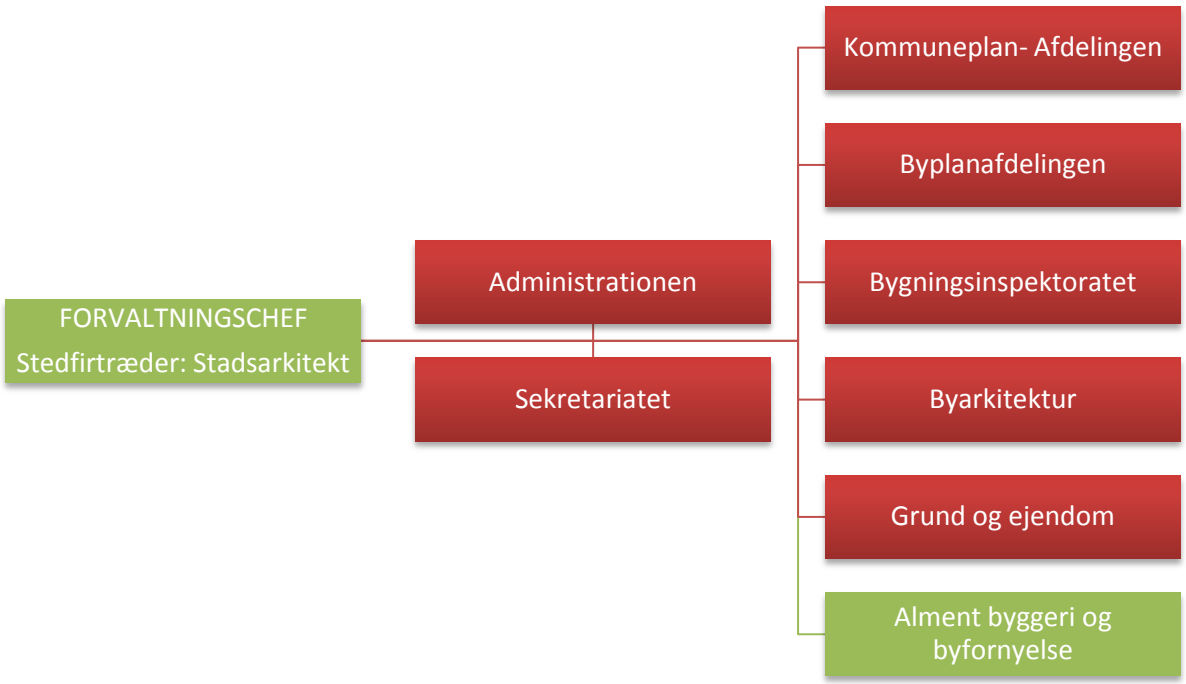


Figure 5 Organization of department of planning and building[19] *(in green branches in which Bøjensen is involved in).*

Due to her direct involvement in the Gellerup project, the interview has

[19] Source: http://www.aarhus.dk/da/omkommunen/organisation/teknik-og-miljoe/Planlaegning-og-Byggeri.aspx

focused on relations between social aspects and urban planning, and the evolution of such aspects within her department. Following paragraphs report main statements of her interview.

The two large projects, Gellerup and Viby Syd (both described as fairly "deprived areas") are cross-disciplinary, involving a variety of initiatives and efforts "stretching" across several municipal departments (for instance: social initiatives, schooling, work opportunities and crime prevention, and major physical changes re. demolition, new buildings, new roads, etc).Therefore, it was decided to set up a coordinating office, centrally based in the Mayor's Department, but in close co-operation with the City Architect and various specialists from the Department of Technical Services and Environment. Also, cross-disciplinary steering groups (both political and administrative) were appointed, to ensure progress and to coordinate the work on the many initiatives. Normally, large projects are based in the municipal department where they naturally belong (for instance: the Urban Media Space project – a new central library and citizens' services - is handled by the Department of Culture and Citizens' Services). But the above two projects simply involve too many disciplines to make that a logical solution, they represent "major projects".

Furthermore, both the Gellerup project and the Viby Syd one involve very close cooperation with the housing associations operating the areas. Thus, the appointed steering groups also comprise representatives from these housing associations.

The definition of a "major project" is based on both quantitative factors and political assessment, and the members of the City Council (following the advice of the City's top civil servants) are in charge of such decisions.

The tasks of the Gellerup Secretariat are cooperation with the housing association and external partners, assistance to the local politicians and aldermen, and

to ensure the progress of the project. Each municipal department contributes with min. ½ man-year, either in the form of manpower or financial contribution. The employees are recruited to match competences and the types of tasks at hand.

An urban transformation of the Gellerup housing estate is urgently needed. The estate has been designated as ghetto area by the Government, and it is therefore necessary to reverse an unfortunate trend (the area has started to develop into a "parallel society" – with far too many poor- and poorly integrated inhabitants from third world countries).

Over the next 20 years the plan is to transform the area into an attractive city neighborhood – and an attractive part of Aarhus - which should be a must-see place to visit - with new road layout, businesses, a high street with shops, workplaces, institutions, etc.

A lot of information on foreign researches has been gathered from many sources (literature, personal contacts, study tours, etc.). Furthermore, the City of Aarhus is represented on the national level in a number of committees in various ministries and at the lateral level of Danish local governments (for instance: Programbestyrelsen)[20], and public servants have taken part in various study tours to regenerated neighbourhoods (eg. Biljermeer, Netherlands). Also, the current regeneration project was in fact preceded by another project, covering the Gellerup estate. This so called URBAN programme ran from 2002-2007. Also, we have to mention one book in particular which has recently been thoroughly studied (however, only published in Danish): "Arkitektur der forandrer" by Niels Bjørn Bech-Danielsen ("Architecture which transforms"). Niels Bjørn Bech-Danielsen has also been invited to give speeches on the subject during various workshops in Aarhus.

The former head of the above-mentioned URBAN programme (Sonja Mikkelsen, also former Danish Minister for Transport) that started the work which

has eventually lead to the Overall Development Plan for Gellerup. She was Aarhus' first representative in Programbestyrelsen[20].

The mono-functional estate of Gellerup was built in an entirely different era – and the same lack of insight prevailed in many other countries. Architects of the time wanted to build attractive new homes outside the city centers, with recreational, green surroundings (fresh air and free from local traffic) for the workers/the middle classes.

Interview with Henrik Pedersen

As well as Jette Bøjesen, Henrik Pedersen works at the Department of planning and building, but his tasks are related to the municipality planning, so the interview focuses on more such general aspects and relations with social and environmental problems.

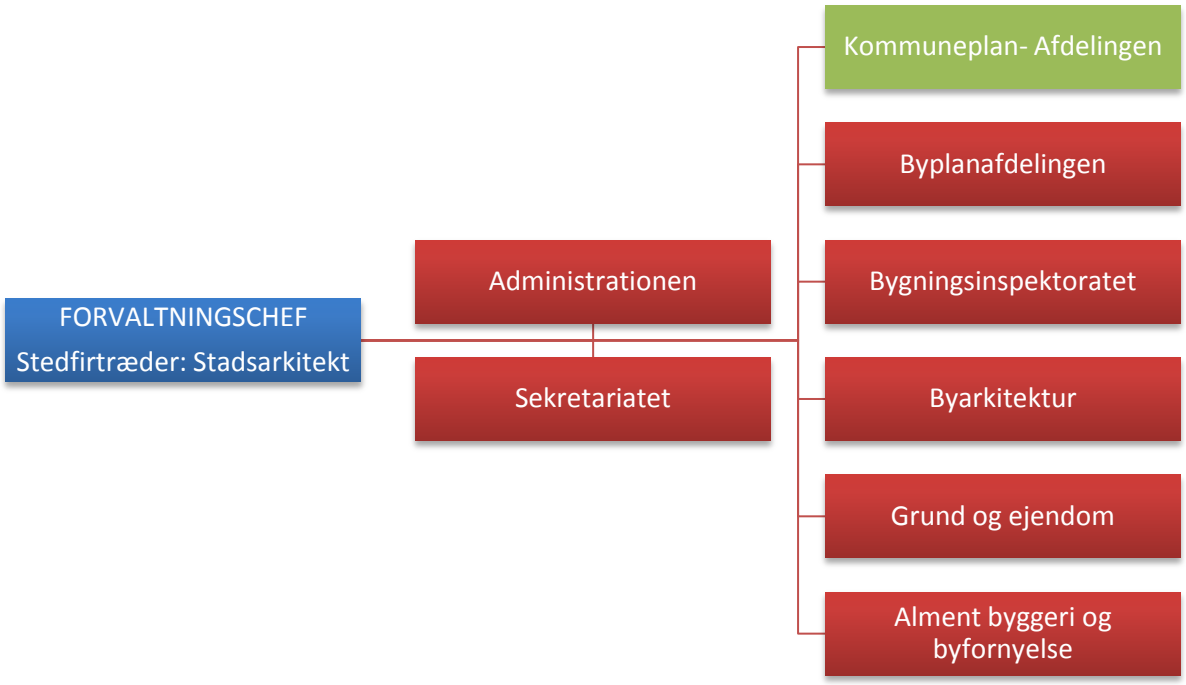


Figure 6 Organization of department of planning and building (in green the branch in which Bøjensen is involved in)

[20]Read more on: http://www.kl.dk/English/

Following paragraphs report main statements of his interview.

My department works on municipality plan (Kommuneplan). It is in the Mayor's agenda and responsibility but it is delegated to our department, due to prevalence of technical aspects. There are 3 technical departments involved in such process (urban planning, nature and environment, traffic and roads) that work together, in collaboration with the Mayor's office. It is in charge of economical aspects, but technical ones are direct managed by the technical department. There are some informal contacts with social departments when problems arise in the planning process, but these relations are quite weak because aldermen come from different political parties. Aldermen would like to have control over the projects inside their own departments, so relations are sporadic. Unless we have a political agreement, we do not create formal groups with other departments; instead, there are no problems between technical departments (urban planning, environment, transport) because there is a common alderman.

In the case of Gellerup's requalification project, inputs come from the mayor's office that is in charge of the whole project but technical department manages planning aspects. In the 60s, Gellerup was a different municipality from Århus. At that time, the idea was a new settlment for higher income groups that should attract people and there were not so many immigrants. The idea was moving people from old apartments of Århus in modern ones, as in Gellerup. Now Gellerup is the poorest area in Denmark. The idea is to open up such area, making new streets, having there new jobs and shops areas. We would like to help people not feeling in an isolated part of the city. The original agenda was "integration", due to the focus on immigration, but it shifted more on "social" aspect, due to focus on the high unemployment and other social problems that may interest Danes living there too. There was a common and strong political commitment towards Gellerup and it was very positive. A political sign occurred when there was a school with only immigrants, and

municipality closed it. Politicians debate about how the situation has evolved and which solutions can solve such problems. Politicians decided to have a public competition, in order to collect ideas about how this area should change. It was a competition of ideas and projects. The idea of radical urban transformations (as destroying buildings) was just one possibility when the department started thinking about that. The municipality invited private actors (as consortia) that propose new approaches and projects. Holland was considered a good example of radical transformation, due also to the fact that a plane crashed in an urbanized area, destroying some buildings[21]. It was a "radical way" to start such important project. Here in Århus we knew what we wanted to chang, but we did not know how to do that. Up to now, I cannot say if Gellerup project provides us a general knowledge about how dealing with planning process, because I think we should wait for further progresses before giving an evaluation.

But urban transformation projects are not the only tasks of my department. At the same time, we work on new urban areas. Up to 80s industrial areas were full of activities and new urban areas were needed. After the 80s, a lot of industries moved away, so now we can use such abandoned areas to fulfill about 1/3 of growing needs but still 2/3 needs new areas. Our experience is that it is very hard to build new areas just putting new rings around the city. The department thinks that it is better to build dense areas, using the concept of "new cities" supplied with transport and every kind of activities. Densification would help to preserve land and provide efficient public transport services.

Conflicts may emerge, as in the case of preservation of ground water, but we work together so we can solve such problems. There is always a political leader in charge of solving problems when there is no agreement among different technical

[21] http://www.msnbc.msn.com/id/29436393/ns/world_news-europe/

departments. Up to now, no serious conflict arose, even when opinions still may be different. There are some common issues (as tackling climate change or preserving ground water) that are shared, so they help preventing problems. There is a working group to share ideas between technical departments that arranges a meeting every two weeks. They talk about new ideas and problems concerning the municipality plan. Furthermore there is a steering group with the heads of the departments. They select, accept and follow recommendations from the first group. Employees that form such group are in charge of spread knowledge within their own departments. There are specific meeting within every department where this information are spread out.

We have external consultants that help us. Some of them provided planning strategy for the new towns. There were a lot of sensitive things about how to change the political strategy, so the idea was to have external advisors that can help us introducing new ideas and proposals. We had several meetings where they made us questions in order to write the political strategy. It has a "psychological" value too, because I can say it was our plan but we wanted someone else to do that. The knowledge background of such consultants is not different from ours. Sometimes we use them to make some specific non-critical tasks (as surveys). Furthermore, we are involved in an international planning group (the Union of Baltic Cities) with other cities (they meet every half years and it has been going for 10 years now). Then we have relations with architectural schools and some students from Aalborg University. We do not have much information coming about sociological aspects of urban transformation from Århus University. Still, we have not involved such external actors in the process of planning of new urban areas. We had some talking with Aalborg University about how we can plan denser cities.

We did not experience an explicit political commitment toward policy integration in term of organizational and procedural measures; instead political focus on environmental issues is high now. Environmental aspects have now an important

part in urban strategies.

Interview with Ole Skou Rasmussen

Ole Skou Rasmussen works at the Department of nature and environment. He is project-supervisor (projektchef), so he has an overall view and responsibility on the department. Furthermore he is directly involved in ground water and afforestation projects. Following paragraphs report main statements from his interview.

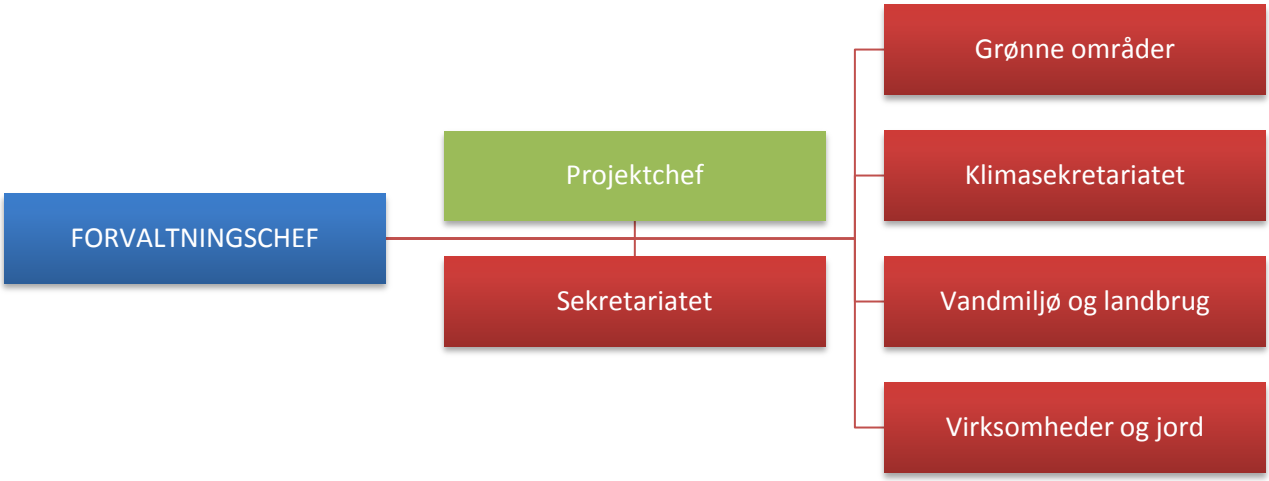


Figure 7Organization of department of nature and environment (in green the branch in which Rasmussen is involved in)

The Municipality plan (Kommuneplan) is the most important document; it is made by a project team. Technical departments (urban planning, environment, and traffic) mainly do the plan, with the participation of Mayor´s office that has an overall overview. I represent my department in this project team. My tasks are related to the open land planning, I look at the city from the "outside" (open land around the urban area) while urban planning looks from the "inside" (the current urban area). Besides different overviews, we have together the responsibility for the kommuneplan. We share common ideas and the environmental department has had a very important influence in such plan, because clean ground water is a political priority. Municipality plan does not allow new settlements where there is a risk of polluting ground water. It

represents the influence of the environmental department in the urban planning process. Such influence is due to the need of tackling climate change too. This means that we would like to have new dense areas to assure public transport, efficient energy use and reduction of CO^2 emissions.

There is a very strong political commitment in having clean environment, both in Århus and at state level; but in Århus we go further, as for instance we would like to double the number of forests. Århus is a leader in managing these environmental aspects, because the municipality wants to grow more, but we already use all the ground water of the city, so it is a very critical situation.

The new urban approach has started changing from the 80s-90s, because there was a social-democratic environmental minister that came from Århus and was very active. At that time, we had many plans at the municipality level, but we could not fund them. The new national leadership granted money for such projects, so it is the reason because there are many state-owned forests in Århus now.

Before the 80s, the environmental department had weak power, because the municipality only had responsibility for city area, instead the county was in charge of planning open land. Nevertheless, in the 80s we made a local plan about green areas, although we did not have any formal authority. It was possible because local aldermen were very interested in that. When the county was shouted down, we extended our authority on open land.

The knowledge background of employees in this department is technical. We form teams to solve projects. Few of them are inter-departments, whilst the others are intra-department. The chiefs of technical departments form a group in order to decide which departments are involved in each project. When there is a need to form a team, chiefs appoint employees from each department. Sometimes initiatives about inter-departments projects come from the alderman directly.

When we start a project, we define, using a formal module, which are aims, knowledge and resources needed. This creates a common knowledge about projects going on. Our problem now is that we have many specialized and highly dedicated people, but we are dealing with political decisions, so we should not make very specific and technical proposals, instead we should formulate them in simpler ways. It is our challenge now. We try everyday to describe a solution as to "a citizen in the street", not dealing with specialists. Our daily problem is introducing specific technical elements within a general and broader overview. The experience of working teams is very positive; we have already made training programs to teach employees about working in team. Working in team is very different from what we were used to do, so we had a lot of effort on training. We have also external consultants that make specific technical tasks (mainly engineers).

We experience conflicts with other departments, this is normal. When there are conflicts that cannot be solved within the technical level (up to heads of departments), we need for a political solution. For example, a classic conflict is when traffic department projects a road through an environmental area. Kommuneplan is one of the most important parts of the solutions, because it provides guidelines to assess projects. Kommuneplan carries both city growth and environmental targets, so they represent not a conflict now because we have already defined these topics in the kommuneplan. Besides kommuneplan, common views are made by weekly meetings of our heads of departments, where they share different perspectives.

Our department has transferred knowledge to other departments, in term of environmental awareness, but it happens also in the opposite way. For example, when I was in charge of overall responsibility for projects, I was sometimes in contraposition with my own department that was only focused only on own targets.

We join a researching team at the University of Copenhagen, called "Forest and Landscape"[22]. We make projects together with them; usually we hired them as consultants. The value of such collaboration is in getting latest results from academic studies, and it is also good when we are seeking for funding. Moreover, I participated in an EU project with other cities, dealing with how deal with green space areas when city grows. We visited and talked each others.

There is a political commitment about taking care of environment, but it does not focus on procedures and organizations. Sometimes we influenced political leaders too. For instance, there was a new right-wing alderman, and only one year after his election, he was highly dedicated to environmental problems too. Sometimes we come up with proposals and if we are able to make them in broader context, than the political level goes further than us. If proposals are understood and accepted, the political level asks for more. But it is not related to procedures or organizations. Political level is not much engaged in our organizational procedures. There was a political idea about a new organization, putting different departments together, but it is uncertain now. It would be easier to work together because now we have first to speak with other aldermen. But political conflicts arose, because the new proposal may influence political powers of aldermen.

Interview with Jesper Frandsen

Jesper Frandsen is an engineer working at the department of traffic and roads as traffic planner

[22] Read more on http://en.sl.life.ku.dk/

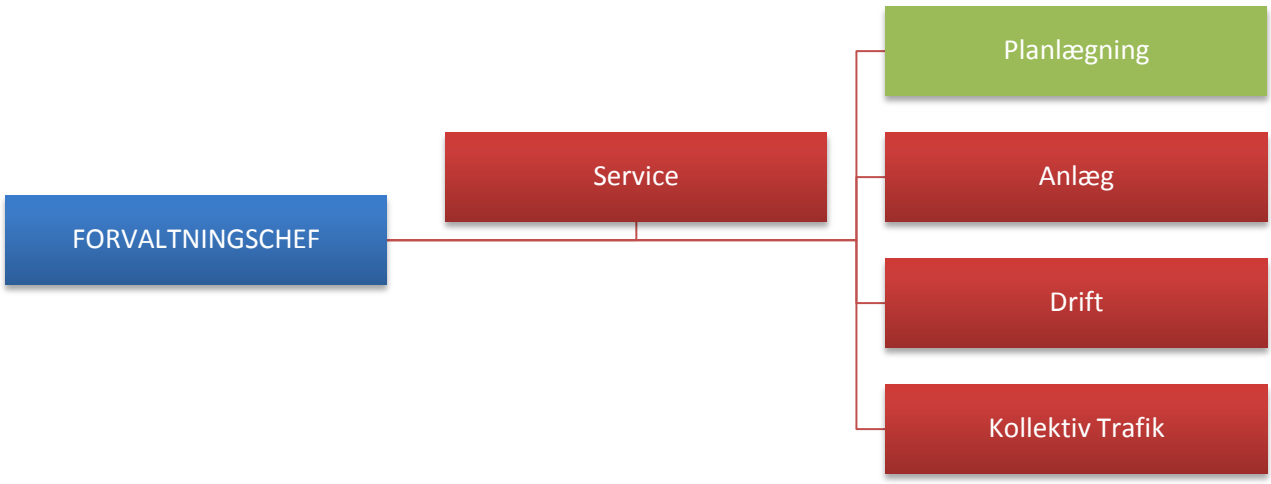


Figure 8Organization of department of traffic and roads (in green the branch in which Frandsen is involved in)

Following paragraphs report main statements of his interview.

The urban planning process is defined in the municipality plan. When we developed the municipality plan, we appointed a team together with the other two technical departments and the mayor´s office. Formally the municipal plan is responsibility of the mayor´s office, but the very know-how is in the technical departments, so the mayor´s office gives responsibility to our departments. This is related to the normal urban planning process. In the case of Gellerup and Viby Syd, there was the need of a new formal organization, within the mayor´s office (big projects office). It is new for municipality to work with ghetto-like issues; we have never done something like that before. It is a different kind of problem, more social. That office works together with the technical departments. I cannot say much more about relations with social department. Environment plays a small role in these two major projects.

The Gellerup´s project carries a new road network, because the idea is to change the structure of the quarter. Gellerup was developed when industrialization grew fast. Most people lived in city center with poor facilities. Apartments were small

and dark. When industrialization took place, Gellerup was considered the future. The idea was to abandon poor apartments in the city's center and move people to modern areas. Gellerup, at that time (the 60s), was considered a very nice and modern place where to live with big apartments, playgrounds, green areas, all facilities. This was considered the right idea for the future. All streets are dead-in to avoid traffic coming, and there is a very good internal cycling and walking network. Moreover, there was not so much traffic. For many years it was a good place where to live, but over the time it has changed. When trouble families came to Århus, the municipality provided an accommodation in Gellerup, so concentration of poor families grew. High-income people moved out to find new places, so the area became a place where nobody from Denmark wants to live. The knowledge that we have gained is that time perspective has changed the ideas behind such area.

When the Gellerup transformation's process started, the municipality looks at Holland, because similar problems occurred. The main idea was to open up the area, this is not allowed by the current road networks, even in there are a lot of public transport services and facilities. Many young people living there like driving very-fast cars, so in the evening the area looks like a racing one and people feel unsafe. These high-speed rounds are the main problem that we want to change. Then there are other important factors. For instance, we would like to provide more services and allow people to buy accommodations there; typically high-income people want to have their own house, so we need to allow that if we want to attract them. So, the idea is to destroy 3 current blocks, build new different houses and move there 1.000 jobs places. Holland's experience shows that road network should be opened, making streets going through the area and reducing the speed limit. Suddenly, traffic becomes a good thing. In this way, other people will come in such areas, and if there is always life in that area, there will be less crime. In the 60s this approach was not present in our knowledge, and actually it is different from our normal working way of today too.

When we do "normal" urban planning, typically single house developments or terraced houses we still focus on traffic calming. In such areas people want them quiet, preferably so that the children can use the roads as playgrounds, even if we tell them, this is not the purpose of roads. So in such areas the old approach is still on-going and residents are satisfied. But when social problems happen, we should turn to the Holland approach. Political agenda focused on Gellerup case. For instance, two years ago a school was closed because there were not Danish students anymore, but only immigrants, so Danish was the second language. The municipality could not solve the problem. Speaking in general, unemployment and illiteracy level was very high, many people did not speak Danish at all, so political debate focused on how solve that, especially if people live on the social welfare. Even if most of problems are social, the way of changing them is through physical changes, so the technical department is highly involved. I do not know much about relations with social department and I do not have direct relation with it.

I know that when problem happened, we organized a public tender to have ideas and projects where private companies participated. These private consortia included both urban planners and sociologists, and they proposed several plans of transformation. These actors were very important, because they have provide several ideas.

More in general, when we do overall planning we have some relations with social department, because it provides us assessment about socio/demographic trends; we need these inputs for the planning process (as estimating the number of schools needed). But the social department is not part of the process; simply we asked it those data.

In the case of Gellerup, there were other projects in such area where social department played an active role, but those actions did not involve urban transformations. Now instead, the approach has focused on physical changes, so

technical department is involved and our main source is the Holland case. A study group went there to study such experience.

Talking more in general about relations between transport and urban planning, we should look back from the 60s. At that time life style was different, mothers stayed home and so the car ownership was lower than today. More people used bicycle and transport systems. We had also a tram system. At that time building new streets and roads was the future. Focus was on increasing mobility and environmental and social awareness about mobility did not exist. There was a plenty of space for new cars and roads. But slowly, globally and locally, awareness of negative effects of car-based mobility arose. The awareness came from the global level, as the Brundtland report on sustainable development. It was a very long and slow process. I cannot say if there were politicians or the technicians that focused first on such problems. In the municipality we focused only on travel speed and travelling time. We still think that they are important factors, but now we want to take care of environmental aspects too. We realize now that transport impacts on environment. These goals are now together in all municipality plans and it is reason because we promote cycling, public transport and we want to introduce again the light rail system (LRT). When we started focusing on public transport, we shifted perspectives. Now we need to understand which level of public transport is needed in order to avoid that people buy new cars, and how much new city should be dense in order to provide an efficient use of public transport. There are a lot of urban transformations going on now, there are many abandoned industrial areas that are good opportunities to have denser city. Densification will help to provide good cycling networks and public transport networks. Furthermore, we know that we should not increase the number of parking areas, to reduce the level of car-ownership. This is our environmental focus now. And we know that dense cities are also energy efficient.

We know that new urbanizations are needed. Our previous approach was to

spread new urbanizations all around the city. Many suburbs, as Mårlset in the south, grew and grew without good infrastructures. This growing process created lot of environmental problems, so we decided that for the future we want to build only new dense mix cities where there will be important public transport services, as the light rail system. These new cities will be self-sufficient with schools and institutions. This is the knowledge that we have now. We will not build anymore detached house areas. We know that in that way we can cut relations between urban growth and environmental problems. These areas for new cities were defined together with other technical departments; for instance, the environmental department defined critical areas were it is not good at build new settlements. Thanks to meeting with environmental department, we selected together only few among several areas were environmental problems do not emerge. We made common proposals based on cooperation between departments. There were not critical conflicts because we share clear goals (the growing approach and water preserving) and still we have enough space to fulfill growing goals. The cooperation has worked very well. At this level it is hard to involve social department too. We gained experience from Gellerup and we use now this knowledge in the physical planning, so we have defined this awareness. Trying to involve social department would be too much complex. Our internal knowledge is now enough to avoid new urbanizations become kind of ghettos.

National legislation requires that municipality assesses environmental impact of new projects. It is a coordinated process of all the technical departments. The new legislation of 2007 did not impact too much on our activity. The county level was abolished but Århus was already a big municipality and we did not merge with any other municipalities, so our tasks did not change. Except of this weak the role of national planning is weak. The very concept is that we need now a sort of coordination with other municipalities, because the county level does not exist anymore.

The analysis of interviews

The analysis of the interviews wants to highlight elements of the theoretical background already defined. According to the framework, such elements should run together in order to underline relations between learning elements and EPI in the context of sustainable urban planning and transport policies.

In order to perform the analysis, there is a need of a framework that could help putting together these different elements. As already stated, the basic element resides in the fact that EPI can be seen as learning process that produces individual and organizational changes, through changes to the knowledge background.

I use the Gregersen and Johnson's framework that analyses policy changes (Gregersen & Johnson, 2010). They propose an innovation analysis towards sustainability of policy making process that considers "Policy learning….an integrated part of the learning economy. It implies that policy-making itself is a process of learning" (Gregersen & Johnson, 2010, p.1). According to that framework, seven elements may concur on the process of policy innovation[23]:

- **Forming visions** about the learning economy as an environment for innovation and sustainable development and forming the value premises of innovation policy.
- **Developing a system of innovation approach** to policy making including development of new concepts, data, and theories of innovation and systems of innovation.
- **Establishing new practices and routines** in the conduct of policies stimulating learning and innovation including gradually trying, testing, and evaluating new practices and routines.

[23] The following list is copied by the paper

- **Stimulating regional and local experiments** in policy areas in need of reform and developing new methods to evaluate the outcomes of such experiments that take into account learning effects.
- **Institution building** that supports the production and reproduction of human and social capital and diffusing international, regional and local 'good practices' in this field.
- **Analyzing and comparing systemic features** and critically important indicators in a form for benchmarking across regions, organizations and nations.
- **Stimulating democratic participation** in the design and implementation of innovation strategies including forms of ongoing dialogues between employees, unions, researchers and governments. This aspect has been not analyzed in the interviews.

Forming a vision

Forming a vision represents the long term shared idea that drives the innovation. This basically answers to the question "innovation for what?". Literature and the interviews show as such vision as changed over the time.

In the literature, the new vision is rooted in two main roots. The first, represented by Cervero, shows the increasing awareness of the effect of car-based mobility on social and environmental aspects. Car-based mobility is considered a dominant and significant technology with important effects on life-style and urban environment. The second, starting from the Brundtland report, defines the importance of environmental aspects for the human life, as represented by the normative aspect of EPI, where environmental policies should have principled priority in order to avoid that environmental degradation occurs. The interviews show clearly both such dynamics.

As Frandsen clearly pointed out "In the 60s building new streets and roads was the future. Focus was on increasing mobility and environmental and social awareness about mobility did not exist". The process of enlighten about environmental and social aspects came from different sources. On one side Frandsen states that "The awareness came from the global level, as the Brundtland report. It was a very long and slow process. I cannot say if there were politicians or the technicians that focused first on such problems". This shows as environmental aspects slowly were introduced in the policy making process. On the other side there was a shifting perspective on urban life-style and social relations "When industrialization took place, Gellerup was considered the future. The idea was to abandon such poor apartments in the center and move in hi-tech areas, and Gellerup…was considered the right idea for the future". Over the time, the negative effects of transport barriers became evident "Experience from Holland is that we should open up the road network, making the roads going through to have more low-speed traffic. Suddenly, traffic becomes a good thing. In this way, other people will come in such areas, if there is always life in that area, there will be less crime". This sentence shows the evolution of knowledge about social effects of urban planning process, and this has created growing awareness about the influences of physical planning on social variables.

The process of forming a vision relied on increasing knowledge about relations between such economical, social and environmental dimensions. Knowledge about principles and laws of motion in nature, in the human mind and in society (the know-why as defined by Lundvall and Johnson) has been the most important source of innovation here. This happened because the know-why provided new cognitive models, concepts and tools to analyze and forecast relations between transport system and urban planning, but also relations between policy making process and policy outcomes. This is showed in the interviews, both for environmental and social aspects when interviewees say that "now we want to take care of environmental

aspects too….we realize now the effects of transport on environment." And "our internal knowledge is now enough to avoid new urbanizations become kind of ghettos".

The new knowledge about principles and laws has created, using the words of Nonaka, a fluctuation in the individuals' knowledge. The Brundtland report and the knowledge about relations between transport and urban planning have represented triggers that have changed individuals' perspectives and broke-down routines and common patterns. In the case of Århus such situation has been boosted by a sense of urgency created by the need of preserving clean ground water. As Rasmussen says "clean ground water is a priority" because the city is already exploiting clean water at the maximum capacity and in such condition the city may not fulfill the need of water for the future, according to the growing targets.

It is interesting to highlight that the sense of urgency is created through a knowledge about data and facts, but within a wider context of "know-why" where relations between such dynamics are explained.

The creation of the vision, through fluctuation of environment, and the sense of urgency created by the need of preserving ground water have created a new intention in the municipality. The intention represents the individual state of a person that raises attention toward a phenomenon. The creation of the vision came also through specific facts and events that create a sense of urgency, as in the case of the Gellerup´s school. As Frandsen says "Political agenda focused on Gellerup case. For instance, two years ago a school was closed because there were not Danish students anymore, only immigrants, so Danish was the second language. The municipality could not solve the problem" the school´s future was on the political agenda and public opinion debated about that. Pedersen reports the same concept "A political sign occurred when there was a school with only immigrants, so municipality closed it and a political debate began about the situation there in Gellerup, trying to find

radical solutions to such problems. The idea was to start a completion to collect ideas about radical transformations". The school represented a trigger that creates a fluctuation of the external environment, and this turned in a sense of urgency toward the problem, notwithstanding social changes were happening over the long period. This event emerged the problem that was growing under the line and created the sense of urgency that helped to consider such problem a priority in the political agenda.

As in the case of the Gellerup´s school, the crash of a plane in Holland was a non-expected event that created the conditions for a new approach to urban planning. As Pedersen points out "Holland was an example of radical transformation, due also to a plane crash that destroyed some buildings[24]. It was a "radical way" to start such important project". This creates something new (the possibility of demolition as way of starting projects of urban transformation) that was not even considered in the public administration. As he says "Here in Århus we knew what we wanted to change, but we did not know how to do that", the idea of such radical transformations came from external factors that may be natural and/or accidental.

The process of forming a vision reflects the level of policy strategy in the EPI, where changes in the vision represent the reframing approach in which political level and civil servants shift perspectives.

The role of EU in shaping such policies has been controversial. At one side, EU level has promoted EPI as a tool to manage environmental aspects (and the Cardiff process was the main important trigger), but, on the other side urban sprawl has not been considered a priority at the European level, even when the European Environmental Agency was quite active on this topic. The European contribute towards forming a vision has been main influenced by such technical agencies (where

[24] http://www.msnbc.msn.com/id/29436393/ns/world_news-europe/

EEA plays a central role), whereas political level has been not so important. Such technical approach is more likely to influence first civil servants that have scientific and technical networks of relations, than the political level.

Developing a system of innovation approach

Formal and informal institutions influence the process of policy learning, because create feedbacks and incentives. The role of informal institutions is pointed out by Rasmussen "The new urban approach started changing 20 years ago (from the 80s-90s), because there was a social-democratic national politician that was very interested in environment and came from Århus. At that time, we hade many plans at the municipality level, but we could not fund them. With the new national leadership, the municipality has obtained money needed for such projects, so it is the reason because there are many state-owned forests in Århus now". This statement shows that relations based on a shared vision create a system of incentives that promote innovation in the policy making process. In this case there was, at the local level, a lot of ideas and projects but with a lack of fund, whilst there was, at the national level, a lack of projects but with some fund available and a political commitment. The systematic (formal and informal) relations, created in this case by political affinity, set up the right framework that permitted the development of different projects, based on collaboration between national and local level, so vertical integration could happen with positive effects for both institutional levels. Rasmussen points out that positive feedbacks may happen between political level and bureaucratic level too "Sometimes we influenced political leaders too. For instance, there was a new right-wing alderman, and only one year after his election, he was highly dedicated to environmental problems. Sometimes we come up with proposals and if we are able to make them in broader context, than the political level goes further than us. If proposals are understood and accepted, the political level asks for more. But it is not

related to procedures or organizations". In this case, the relations between politicians and civil servants created positive loops and feedbacks, even if not related to specific procedures and organizations. It happens when proposal are made in "a broader context" than the technical one, because such context may arise interest in politicians.

The need of creating broader context for technical proposal is clearly stated by Rasmussen. He argues that the environmental department should develop more a political approach that may help to find better agreements and solutions, because high detailed technical solutions could be not understood by politicians "Our problem now is that we have many specialized and highly dedicated people, but we are dealing with political decisions Instead of making very specific and technical proposals, we should formulate them in simpler ways. It is our challenge now. We try everyday to describe a solution as to "a citizen in the street", not dealing with specialists. Our daily problem is introducing specific technical elements within a general and broader overview". This approach realizes the need of systematic relations, and that these relations can be achieved through a different communicative approach. Using the taxonomy of Asheim, Rasmussen would like to have more systemic and symbolic knowledge within the department, because the department is focusing on "problem solving" approach. It is an expected result, because employees of the department have only technical background, so they carry analytical knowledge about such environmental problems, but problems may arise in working team relations where problem solving and problem oriented approaches arise.

The value of systematic relations with other stakeholders has been pointed out in the interviews, as in the case of Gellerup's project, where the municipality set up a public tender for ideas, inviting different private companies to participate. The municipality realized that new knowledge about how solved such social problems was needed "we knew what we wanted to change such situation, but we did not know what to do". It is important to notice that this process happened only for social related

urban projects, whereas the knowledge about environmental aspects was already embedded in the municipality, so it did not require such relations with other stakeholders. According to Nonaka taxonomy, the public tender helped to share knowledge rooted in "the autonomy" of individuals and organizations (as consortia). Municipality collected ideas that came from different organizations with different mental models based on diverse experiences, perspectives and background. It helped to collect projects and ideas that otherwise would have been hard to define.

Establishing new practices, routines and institution buildings

Repeated practices and institution buildings define routines that embed the organizational knowledge. Routines change over the time, according to the fluctuation of the environment, but, at the same time, pro-active management can try to force changes to such routines, in order to push organizational learning. Routines support the production and reproduction of human and social capital and the diffusion of knowledge. In term of EPI, routines represent mainly the instrumental level in which organizational and procedural tools are used to achieve environmental targets.

The municipality plan represents the most important way to merge sectorial policies that carry different aims and targets. All the interviews have stressed the positive role of such instrument, because it has provided guidelines for preventing and solving conflicts. The Municipality plan creates a view, shared by the different technical departments. As Rasmussen highlights, in the municipal plan different views are merged "My tasks are related to the open land planning, I look at the city from the "outside" (open land around the city) while urban planning looks from the "inside" (the current urban areas). Besides different overviews, we have together the responsibility for the kommuneplan" and conflicts should be solved at this level.

The value of the municipality plan is boosted by the organizational structure, where different technical departments depend on one political leader (alderman). It

has permitted the creation of a common environment, through formal (team working) and informal relations that have contributed to the integration of policies different departments. The lack of integration with other departments (the non technical ones) has showed that no valuable relations arise when barriers occur. As Pedersen says "There are some informal contacts with social departments when problems arise in the development process, but not such strong relations because aldermen come from different political parties. Aldermen would like to have control over the projects inside their own departments, so relations are complex. Unless we have a political agreement, we do not create formal groups with other departments". The same happens in the traffic department, where Frandsen says "More in general, when we do overall planning we have some relations with social department, because it provides us assessment about socio/demographic trends; we need these inputs for the planning process. But the social department is not part of the process; simply we ask it those data". Relations with social departments occur only in term of asking data (know-what). This has created a situation in which environmental elements have been well integrated in the urban planning process, due to the systemic relations between the technical departments, whereas the arise of social problems related to the urban planning process has needed the creation of a new organizational structure within the Mayor´s office. This point has been clearly defined in the interviews. As Bøjesen says "The two large projects, Gellerup and Viby Syd (both described as fairly "deprived areas") are cross-disciplinary, involving a variety of initiatives and efforts "stretching" across several municipal departments (for instance: social initiatives, schooling, work opportunities and crime prevention, and major physical changes re. demolition, new buildings, new roads, etc).Therefore, it was decided to set up a "coordinating office", centrally based in the Mayor's Department, but in close co-operation with the City Architect and various specialists from the Department of Technical Services and Environment. Also, cross-disciplinary steering groups (both

political and administrative) were appointed, to ensure progress and to coordinate the work on the many initiatives". Similar conclusions are made by Frandsen "In the case of Gellerup and Viby Syd, there was the need of a new formal organization, within the mayor´s office. It is new for municipality to work with ghetto-like issues; we have never done something like that before".

When literature and data (know-why and know-what) showed evidences of social effects of urban planning process, and when the municipality defined a new vision that required radical changes, there were not formal and informal institutions that could manage such process, so it has required the creation of a "coordination" body neither within the social department, nor within the technical ones, probably due to the political differences and the need to stress the idea that such involve different departments.

Up to now, the Århus organization shows two different institutional behaviours respect to the urban planning process: environmental aspects are integrated within procedures and organization, whilst social aspects are integrated through "not ordinary" procedures and organization, with a specific body of rules and practices. The interviews show these two parallel ways, where social projects are considered in a different agenda from the environmental ones and the two different approaches are not considered a weak point. As Frandsen says "We gained experience from Gellerup and we use now this knowledge in the physical planning, so we have defined this awareness. Trying to involve social department would be too much complex.". According to Nonaka, there is a lack of "intention" in integrating more relations with social department. The lack of commitment, at the bureaucratic level, does not mean that such debate is happening at the political level, and this is confirmed by a political proposal to push further the integration between social and technical aspects. Rasmussen says that "There was a political idea about a new organization, putting different departments together, but it is uncertain now". It may show that where new

practices do not emerge from the bureaucracy itself, there may be the need of political commitment towards that.

The use of working team has been considered a very important tool to share knowledge between departments. All the interviews point out positive effects of such working method. As Rasmussen says "The experience of working teams is very positive; we have already made training programs to teach employees about working in team. Working in team is very different, so we had a lot of effort on training". Working team is considered a way to solve and prevent conflicts too, because it helps to understand aims and targets of other departments. About this point, Rasmussens notices that "When I was in charge of overall responsibility for projects, I was sometimes in contraposition with my own department that was only focused only on own environmental targets". Working teams are formed only among technical departments, because they share common practices and political leadership (alderman). The effectiveness of working teams and organizational procedures is supervised by a steering group, formed by the heads of technical departments, and a second supporting group in charge of defining proposals and sharing ideas. Besides that, every department performs its own working teams and steering group to assure that the flow of knowledge is spread out within the whole organization. Working group has helped employees to define new ideas based on the Nonaka´s concept of autonomy.

The analysis of the interviews shows the role of national/regional levels in influencing routines and institutional organization of Århus municipality.

In the 80s, the municipality had no authority on open land, so the environmental department had less importance in the planning process. As Rasmussen states "Before the 80s, the environmental department had weak power, also because the municipality only had to deal with the city area and was the county to manage the open land. Anyway in the middle of 80s we made a municipality plan

about green areas, although we did not have any formal authority. It was possible because local aldermen were very interested in that. When the county was shouted down, we had more authority and tasks, providing also assessments of different projects that impact on open land". Moreover in 2007 a new legislation about urban planning has been adopted but as Pedersen says "the new legislation of 2007 did not impact too much our activity. The county level was abolished but Århus was already a big municipality and we did not merge with any other municipalities, so our tasks did not change. The very concept is that we need now a sort of coordination with other municipalities, because the county level does not exist anymore". Furthermore, national legislation requires environmental impact assessment of new projects, as Pedersen says "When we do new projects, municipality has to assess environmental impacts, but again it is a coordinating process where assessment is made together with the other technical departments". This sentence shows that the impact of new legislation was not so high because there were already procedures and organizations that integrated environmental aspects within the planning process.

The practices and rules of the municipality show an integrated vision that carries the concept of inclusion of environmental objectives in the urban planning process. It represents the first level towards policy integration. Consistency and weighting refer to further levels but analysis does not show "win-lose" situations that could help investigating such concepts. When "win-win" situations occur, it is hard to define the weighting of environmental objectives respect to other ones, because priorities are not showed. Some insights emerge from the interviews, but they are not enough to draw conclusions. Rasmussen states that environmental targets have strong influence in the whole process of planning, but both Rasmussen and Frandsen state that important conflicts did not emerge, because the growth targets can be fulfilled using areas that have no critical environmental conditions. This means that, according to the interviews, there are not conditions that require a choice in term of

reducing growing targets or increasing environmental degradation. Under these conditions, EPI presents "win-win" solutions in the case of Århus.

Stimulating regional and local experiments

From an evolutionary point of view, creating room for variety is crucial for the innovative dynamics (Gregersen & Johnson, 2010). Variety can happen also through the observation of other experiences in similar contexts. The interviews show an intense activity in such area of innovation, both for environmental and social aspects.

In the case of Gellerup's project of urban transformation, the municipality has performed visit tours and studies about similar experiences in Holland. As Bøjesen states "A lot of information on foreign experiences has been gathered from many sources (literature, personal contacts, study tours, etc.). Furthermore, the City of Aarhus is represented on the national level in a number of committees in various ministries and at the lateral level of Danish local governments (for instance: Programbestyrelsen)[20], and public servants have taken part in various study tours to regenerated neighbourhoods (eg. Biljermeer, Netherlands). Also, the current regeneration project was in fact preceded by another project, covering the Gellerup estate. This so called URBAN programme ran from 2002-2007". Local experiments have not been performed yet in such area as Pedersen says "Up to now, Gellerup project does not provide specific knowledge for the department, because we should have further progresses before giving an evaluation". All the interviews highlights that Gellerup's case is quite new, so there was a lack of internal knowledge when authority decided to change such situation.

In similar way, knowledge about relations between environmental aspects and urban planning process has been gathered through different international experiences. Both Pedersen "we are involved in a planning group (the Union of Baltic Cities) with other cities. We meet every half years and it has been going for 10 years now" and

Rasmussen "We join a researching team at the University of Copenhagen, called "Forest and Landscape"[25]. We make projects together with them, we hired them as consultants. The value of such collaboration is in getting latest results from academic studies, and it is also good when we are seeking for funding. Moreover, I participated in an EU project with other cities, dealing with how deal with green space areas when city grows. We visited and talked each others" point out the value of external projects and collaborations in acquiring knowledge about feasible ways to solve problems.

These international experiences create networks of civil servants and politicians that represent a community of knowledge. The value of know-who is important in finding and defining similar cases and enabling the transfer of knowledge. These networks create rooms for sharing experience. This represents a source of fluctuation, because information about external environment is acquired.

International experiences and public tender for Gellerup have provided the first element of the Nonaka's spiral process that is the enlargement of individual´s knowledge that helps to accumulate tacit knowledge. The value of the variety in the Gregersen & Johnson's model is the enlightment about new experiences, that enables the enlargment of individual´s knowledge.

The need of experiments and creation of variety has been promoted by the lack of political priority that urban sprawl has at the European level; this situation creates need of investigation for new approaches and solutions. In this context, stimulating experiments and sharing knowledge among networks becomes a critical factor of success.

Analyzing and comparing systemic feature

The systematic monitoring and benchmarking of different performance

[25] Read more on http://en.sl.life.ku.dk/

indicators helped to create environmental awareness because it points out that reserve of clean ground water cannot be exploited with the same growing trends of the past.

The case of Gellerup's school shows that educational outcomes were one of the worst in the whole Denmark and it represented an indicator of such social problems. At the same time, the level of unemployment and illiteracy in that area produced insights about the critical condition of the area. As Bøjesen states "an urban transformation of the Gellerup housing estate is urgently needed. The estate has been designated a ghetto area by the Government, and it is therefore necessary to reverse an unfortunate trend (the area has started to develop into a "parallel society" – with far too many poor- and poorly integrated inhabitants from third world countries)". Knowledge about such trends, worst than the average, has provided feedbacks to the policy makers that create awareness. The analysis of trends has also permitted a debate about the real nature of such urban transformations. As Pedersen says "The original agenda was "integration", due to the focus on immigration, but it shifted more on "social" aspect, due to focus on the high unemployment and other social problems that may interest Danes living there too". Data have showed that problems are not related only to the immigrants living there, but involve Danes too. The analysis of these trends has defined two visions about such problems that should be defined as "integration" vs "inclusion" approach. This reframing of the problem may have important effects on the political debate, because may represent two different causal relations. Integration approach is based on the concept that social problems arise because there are many immigrants not well integrated living in Gellerup, whilst inclusion approach is based on the concept that social problems arise because there are too many poor people living there.

According to the interviews, it seems that the monitoring of data have created the awareness about the problems, but only specific spot events, as the closing down of the school has given urgency towards the problem and has created the condition to

define radical project of urban transformations. The process of analyzing systemic data creates knowledge about trends that otherwise may be under the line. A systemic approach helps to create awareness about long-term trends that otherwise could be unaware.

Critical elements of the interviews

I could not catch some of the information that I wanted to collect. The main problem was that I could not interview all the persons in my list. No one of the social department answered to my contacts, so I could not catch the perspective of the social department. All the information came from the technical departments or the Mayor's office (in which there are some employees of social department.

Moreover I could not interview any politicians, because aldermen were always busy and did not give availability for interviews. For this reason, I "forced" the civil servants that I interviewed to give some feedbacks about the political debate and positions, in order to fulfill such gap. I could also not interview two external consultants that did not answer to my contacts.

I expected that interviewees would have given more contacts about other stakeholders involved, instead the only contacts were among employees of technical departments (as for example, the environmental department suggested me to contact the urban planning or the transport one), so I could not expand the networks as I expected. The "roll the snowball" technique did not work.

Moreover I could not find English written official documents; this did not allow me to find other contacts through the analysis of written documentation. Even if I did not have any contacts, I think that consultants, house organizations and universities may provide interesting information and new concepts may be unveiled by interviewing external stakeholders.

As general consideration, the process of finding potential interviewees and arranging meetings through email was longer than expected, due to the long time between the first contacts and the answers (usually 3 weeks). In order to reduce time lag of further steps, I was forced to put pressure on some of the contacts through direct contact by phone.

Conclusion

This chapter expands some of the main insights collected by the interviews and draws some general conclusions, according to the initial research theses that are again reported:

1. *Policy learning occurs through a process of integration between transport and land development policies. Integration can be referred to policy objectives, strategies and instruments and can involve different actors and political institutions.*
2. *Learning could be a crisis-driven phenomenon or a process of incremental improvement of knowledge embedded in organizational routines. Crises or advances in organizational knowledge shape pace and direction of policy integration.*

The literature about sustainable development, EPI and relations between transport and social/environmental factors has provided knowledge about the process of learning. According to such literature, integration of transport and land development policy is an evolution of the policy making process, and it has been considered the lodestar from the municipality of Århus that has tried to modify organizational routines in such direction. This process has evolved over a long period in which incremental improvements have been achieved.

The analysis of Nonaka´s model has modeled such process of incremental improvements, through the analysis of the fluctuation of the environment, and the change in the intentions of organizational structure. Interviews have showed that mental models evolve, thanks to interactions between different actors and institutions, through formal and informal networks that have provided the rooms for variety of experiences. This represents the Nonaka´s definition of autonomy, where different individuals share mental models in order to find new solutions. Advances in the

organizational structure, using working teams, and crises have boosted the pace of innovation. Crises have influenced the municipality´s organization in different ways. For example, poor performance of social indicators has created break-downs in the current organizational structures, because the integration of social aspects within the urban planning process was not developed. As in the case of Gellerup´s project of urban transformation, such crisis has required the definition of new routines and organizational structure. Instead, in the case of environmental aspects, as the case of preservation of clean ground water, the current organization has been able to cope with such crises, and integrating approach has been defined using the current policy instruments (starting from the municipality plan) and adapting routines in the existent organization. In the case of social crises, where the analysis of trends is not systematic, changes of routines have required external triggers, as the case of the school in Gellerup that has created fluctuation of the environment (using Nonaka's words) and created a lively debate on such areas. In the same way, the process of finding solutions has found innovative ideas from the case of Holland, where a plan accident created the possibility of planning a radical urban transformation of poor areas.

The process of integration, mainly for environmental aspects, has been performed through the integration of objectives (both environmental and other targets are clearly stated in the municipality plan), strategies and instruments that are mainly represented by the fact that all technical departments are within only one political leadership, and by the fact that the municipality plan represents, for the three technical departments, the most important planning tool.

The knowledge changes organizational routines only when embedded in the organization; this represents learning. As interviews said, new ghetto areas or new low-density areas are not going to happen anymore because the municipality acquired such knowledge about the relations between planning and environmental/social

aspects.

Some notes about the Nonaka's model

The interviews have provided useful elements for the analysis of the Nonaka's model of learning.

As the model states, there are three basic factors that induce individual commitment in an organizational setting; "intention," and "autonomy," and a certain level of environmental "fluctuation". These factors have been founded in the interviews, so, according to such model, the process of knowledge creation may happen. These levels are required, because the Nonaka's model assumes that knowledge creation process starts from individuals, so organizations cannot create knowledge without individuals commitment, elaborated through the three factors above mentioned.

Anyway, these levels do not explain how the process of knowledge is transferred; they only define the basic conditions that enable such transfer. The transferring model is based on the combination of transferring between explicit and tacit knowledge. According to Nonaka, such transfer happens trough the processes of internalization, socialization, externalization and combination, as already defined in the theoretical part.

The interviews have showed some interesting feedbacks about the whole process. On one side, the interviews confirm that such processes happen, so there are phenomena of internalization (where implicit knowledge is acquired), socialization (where implicit knowledge is transferred), externalization (where explicit knowledge is acquired) and combination (where explicit knowledge is transferred). For instance, the case of working team has been a powerful tool in order to boost tacit aspects of knowledge, whereas the network of international experiences as been a way to boost

both implicit and explicit forms of knowledge. On the other side, it looks that the Nonaka's model defines a strictly pattern of knowledge transfer, where internalization plays the first movement. According to Nonaka, the first element of the spiral process is the enlargement of individual´s knowledge that helps to accumulate tacit knowledge. So the process defines a clear pattern: first implicit knowledge is acquired, than it is transferred, than it becomes explicit and at the end, explicit knowledge is combined. Respects to this approach, the interviews have showed that the spiral process happens, but it can happen in a different order. For instance, the literature has been a powerful trigger that creates the intention of individuals. Under this perspective, the literature can be considered as explicit knowledge (a form of know-why). The interviews showed that in some cases the explicit form of knowledge influenced the mental models and creates the break-down for a learning process. Respect to the Nonaka's model of knowledge transfer, evidences show that the process defines properly four ways of knowledge transfer and that distinction between tacit and explicit knowledge is useful; anyway interviews stress the spiral approach, where it is not possible to define "the first element" of such process, because fluctuation of the environment can reside both in explicit and/or implicit aspects of knowledge.

Some notes about Lundvall and Johnson taxonomy

Lundvall and Johnson have provided a taxonomy, used to classify different aspects of the knowledge. The concept of know-what, know-why, know-who and know-how has been analyzed in the interviews and findings have confirmed such taxonomy, as a useful one. Know-why has been founded in the evolution of the literature over the time and the analysis of international experience, creating and shaping new employees' mental models. Know-what, related to the knowledge of the data, has confirmed that data itself does not produce knowledge, because mental

models are needed in order to interpret the meaning of such information. For instance, the transport policy's approach has defined as travelling time is an important element in the analysis of the performance of transport system, but, respect to the 60s, the municipality has defined a different perspective about the effects of this variable. In the 60s it represented an unequivocal value, because reducing travelling time was considered always positive; now, there is awareness about the fact that lowering travelling time may push urban sprawl, so policies changed approach toward this element.

Know-how has showed its importance in different ways. Working groups have been considered very positive and they allowed transfer of knowledge between and within departments. Moreover, know-how is needed in order to acquire know-why and know-what. As interviews said, the process of changing is very low, and it does not happen just because new information is acquired. So know-how is itself a form of knowledge, but it may be considered as the capacity of using the other forms of knowledge too.

Know-who has been an important source of knowledge for the municipality. It is interesting to notice that know-who played a critical role where there was a lack of knowledge about other forms of knowledge. When the municipality wanted to tackle new problems, employees looked to international experiences; furthermore, they tried to acquire knowledge of other private stakeholders through public tenders too. The interviews seem to give an interpretation about know-who quite interesting: when know-why or know-how are weak, know-who plays a critical role, because it provides a source of tacit knowledge that it is not easy to create. Know-who is an efficient way to acquire know-why because it provides a first selection of information. As the environmental department said, the networks of expertise provide latest knowledge about literature. This process would have required a lot of time if the environmental department wanted to self-develop this knowledge; consultants are

an efficient way of acquiring knowledge when it is needed.

The taxonomy of Lundvall and Johnson has been an useful tool for the analysis of the interview. It is important to notice that this taxonomy works better if it is understood as the 4 dimensions of knowledge, instead of 4 different types of knowledge. This statement is based on the consideration that each of the 4 dimensions cannot be used alone, and it acquires a stronger importance only together with the other dimensions.

Some notes about the EPI

The analysis of the EPI process has been the main aim of the case study. It has showed as, from the 60s, there has been a growing integration of environmental, transport and land planning policies. The integration occurred at the normative level (where environmental outcomes became important factors in the policy making process) as well as at organizational and procedural level, where technical departments are within the same political structure and inter-departments working teams are used very often.

As the literature about EPI shows, the concept of sustainability plays an important role in shaping direction and pace of the integration process, because it provides awareness about environmental aspects, unveiling new problems. The municipality of Århus has been involved in several international networks; this creates a variety of sources that guarantees the up-to-date knowledge and visions about environmental aspects.

The analysis has investigated the Lafferty and Hovden´s definition of EPI in the case of Århus. About the first part "the incorporation of environmental objectives into all stages of policy- making in non-environmental policy sectors, with a specific recognition of this goal as a guiding principle for the planning and execution of

policy", the analysis has showed that integration occurs in the sense that non-environmental policy sectors incorporate environmental aspects. In this case, non-environmental sectors are represented by transport department and urban planning one The second part of the statement "the explicit recognition of this goal as a guiding principle" has been more complex to testify because the municipality´s focus is not on the explicit recognition of such principle, but it is based on the priority given to environmental outcomes. Anyway, it is clear that environment matters in the municipality.

The second part of Lafferty and Hovden´s definition of EPI states that "accompanied by an attempt to aggregate presumed environmental consequences into an overall evaluation of policy, and a commitment to minimize contradictions between environmental and sectorial policies by giving principled priority to the former over the latter". The interviews have showed that an evaluation of presumed environmental consequences happens, due to the working teams approach, due to the national legislation about environmental assessment. The commitment to minimize contradictions has been harder to define, because it seems that critical contradictions did not arise. In this condition, it is not possible to define if environmental outcomes have principled priority respect to other sectorial outcomes.

Policy integration of social outcomes shows different patterns. Such process is not advanced as well as the integration of environmental outcomes. As already showed, organizational and procedural integration did not occur within the current municipality´s structure; new bodies were created in order to deal with land development projects that carry social aspects. The very weak point is that interviews reveal a lack of awareness about the relations between social and environmental aspects. These aspects reside in two different political agenda, some projects have social effects, and others have environmental ones. This is not consistent with the current literature about the effects of car-based transport and urban development

policies on land consumption and social relations. Some employees show personal awareness about such relations, but this knowledge is not embed within the organization. This process shows lack of integration that is revealed through the whole policy-making process: vision, strategies, organizations, procedures and instruments do not carry an integrated approach of environmental and social aspects. This would represent the next fundamental paradigmatic shift in transport and land development approach, where the first has been based on the integration of environmental aspects, and the next should focus on the creation of the common dimension for environmental and social aspects.

The creative city, proposal for further researches

This project has focused on the integration of social and environmental aspects in the urban policy process, with the aim of reducing negative environmental and social impacts typical of modern urban areas. The very idea was that urban areas suffer for several negative phenomena, and urban planning process should be considered a way to tackle them. Thinking urban policies and social/environmental aspects as related has been the core vision of the project.

Different visions may arise over the time, according to the evolution of local and supra-local trends, political debate, values and knowledge. Different visions imply different patterns of innovation. Innovation is not a stand-alone process, it may follow different trajectories, according to a basic question that I define as "Innovation for what?" where "the what" has represented, in this project, the integration of urban policies in order to reduce negative effects of urban planning process.

Looking at main trends and projects in the city of Århus, I have found this aim particularly interesting and topical in the municipality, so I have decided to investigate this aspect. Nevertheless, other living elements arose and may be of interest for further analyses.

The most interesting one that intrigues me is the idea of Århus as a city of knowledge and creativity, where those elements may promote high-value business and vibrant social life. The municipality of Århus is focusing on several projects in order to promote Århus as a city of knowledge. The City Council would like to be the European Capital of Culture programme 2017, based on the idea that "Aarhus city's identity and arts and culture will be pivotal in the coming years in Aarhus"[26]. The city use the motto "we use culture to rethink the city" in order to "to underline the sense of radical change cities are challenged with in a world with multiple global challenges which demand rethinking – redesigning - reconnecting – rebuilding, and on many levels : urban infrastructure transport, energy and resources, climate, cultural co-existence, democracy, diversity, sustainability, social polarization, economic and financial models"[26].

Many projects have been defined in order to boost such transformations. For instance the building of a new multimedia library in the harbour is a way to bring new life into the old industrial area integrating "knowledge sharing and opens source innovation environments with old fashioned books"[26]. The new harbour area is designed as "a large harbour square will act as a direct link between the City and the bay. Two significant building complexes, flanking the harbor square, will house a number of educational and research institutions and the city's new main library…with some 7.000 inhabitants and about 12.000 workplaces"[27]. Furthermore the city has planned a new art production centre "The Freight Yard is a major cultural enterprise. Expected to be ready for use in early 2012, this production centre will lie at the heart of an entirely new city district. It will be located in Aarhus's old freight yard, which is being rebuilt to create a versatile complex that will accommodate the many different

[26] http://www.aarhus.dk/da/sitecore/content/Subsites/CityOfAarhus/Home/The-international-perspective/Large-development-projects/European-City-of-Culture-2017.aspx

[27] http://www.aarhus.dk/da/sitecore/content/Subsites/CityOfAarhus/Home/The-international-perspective/Large-development-projects/A-New-Maritime-Urban-Area.aspx

needs of these art forms and make it possible for them to enter into new overarching collaborations. The production centre will include e.g. stages for theatre and dance, a music venue, apartments for artists in residence, workstations, workshops, common studies, a café etc"[28].

Innovation and knowledge is considered a crucial element for the business development local strategies. The municipality claims that "The recently published study, conducted by PricewaterhouseCoopers Hamburg, focused on the creative sectors and compared the business policy initiatives and their effects in nine medium-sized Baltic cities. The City of Aarhus did remarkably well when compared against the three parameters innovation, knowledge and openness, in particular on innovation and knowledge. The City's business policy is highlighted as a successful and effective example of strengthening the creative sectors". The mayor of Aarhus, Nicolai Wammen stated that "The study shows that we are on the right track.....we are therefore continuing to focus on strengthening our position as one of the leading growth centres within the knowledge economy".

These statements show commitment towards the creation of a creative environment; this requires a process of learning that changes the policy making process, integrating creative aspects and effects in the assessment and evaluation of urban policies. I consider this phenomenon an interesting case study for further analyses, due to the presence of academic literature and living phenomena in the city.

Literature shows that learning, creativity and innovation are mostly city phenomena. Density, diversity and interaction feeds innovation and cities are the only places that may provide this, support economic, social and political development.

Wolfe and Bramwell states that "Many aspects of the contemporary economic

[28] http://www.aarhus.dk/da/sitecore/content/Subsites/CityOfAarhus/Home/The-international-perspective/Large-development-projects/Art-Production-Centres.aspx

changes make cities more, not less, important as principal sites for innovation, creativity and the production of knowledge–intensive goods and services." (Wolfe & Bramwell, 2008). This happens because "The interactive and social nature of innovation makes city-regions the ideal space in which social learning processes can unfold. Knowledge transfer between highly skilled people happens more easily in cities, because the sheer density and concentration of economic players in large cities offer multiple opportunities for contact, interaction and knowledge circulation" (Wolfe & Bramwell, 2008). This implies that urban policies that enhance social qualities create the right framework for boosting creativity and innovation. Several relations between creativity and urban planning have been investigated. The relations between creativity large and small/medium cities is still not cleared "while there is substantial agreement on the advantages that accrue to the largest city–regions as centres of innovative activity, there is less consensus on the prospects for mid–size and smaller urban regions in this regard" (Wolfe & Bramwell, 2008), due to the significant diseconomies of scale of big urban areas, in which congestion, commuting time and environmental degradation play an important role, as well as social dynamics. From this perspective, literature shows that "urban regions that are successful in developing tolerant and welcoming attitudes towards tolerance and social diversity are likely to succeed in attracting and retaining highly educated workers" (Wolfe & Bramwell, 2008).

The interaction of workers and firms in the urban context creates positive knowledge spill-overs. Glaeser defines "Jacob´s externalities" as "as supporting both competition and knowledge spillovers between industries, which are more likely to occur in an urban economy which is more diverse than average." (Desrochers & Hospers, 2007). This is considered a third way to define knowledge, by contrasting the two hypotheses of Marshall´s and Porter´s spill-overs that focus on one industry. According to Jacobs, diversity becomes an important factor for innovation, and it

explains the concept itself of city (whereas in Marshall and Porter is the cluster or the city-cluster the predominant idea).

Management literature has also increased awareness about creativity and chaos, as key elements for innovation. In a famous book, The Medici effects, the innovation is considered as a product of new creative ideas and combinations, where diversity is a must to have element. A very interesting passage is the following one "When I saw this place[29] for the first time, I realized that the serene environment of the café actually concealed a chaotic universe. The café was filled with ideas and viewpoints from all corners of the world, and these ideas were intermingling and colliding with each other……There is another place just like Peter's Café, but it is not in the Azores. It is in our minds. It is a place where different cultures, domains, and disciplines stream together toward a single point. They connect, allowing for established concepts to clash and combine, ultimately forming a multitude of new, groundbreaking ideas. This place, where the different fields meet, is what I call the Intersection. And the explosion of remarkable innovations that you find there is what I call the Medici Effect" (Johansson, 2006). The Medici was "a banking family in Florence who funded creators from a wide range of disciplines. Thanks to this family and a few others like it, sculptors, scientists, poets, philosophers, financiers, painters, and architects converged upon the city of Florence. There they found each other, learned from one another, and broke down barriers between disciplines and cultures. Together they forged a new world based on new ideas—what became known as the Renaissance. As a result, the city became the epicentre of a creative explosion, one of the most innovative eras in history" (Johansson, 2006). Even if the book does not deal with the role of city itself, it provides interesting insights about micro-foundations of creativity and innovation, and it is quite easy to relate such dynamics

[29] The Author talks about the Peter´s café in Horta, a port city on one of the Azores islands

and personal interactions to vibrant urban areas, where the focus is on diversity, instead of marshallian idea of specialization.

There is an obvious relation between the role of urban planning policies and the same environmental and social policies analysed in this project. Urban planning is one of the policies that should promote social relations and environmental quality, in order to promote creativity and knowledge. A new vision should emerge (or maybe it has emerged already), accounting the effect of transport infrastructure and land development in term of social and environmental factors that turn in creativity. This may require organizational and procedural changes, as happened in the case of the current analysis. In my opinion, it represents a very interesting perspective for further analyses, showing different sides of innovation.

Bibliography

Arbnor, I., & Bjerke, B. (2009). *Methodology for creating business knowledge.* (SAGE, Eds.) (3rd ed., p. 427). London.

Asheim, B. T., & Coenen, L. (2006). Contextualising Regional Innovation Systems in a Globalising Learning Economy: On Knowledge Bases and Institutional Frameworks. *The Journal of Technology Transfer*, *31*(1), 163-173. doi: 10.1007/s10961-005-5028-0.

Attwell, K., & Jensen, O. M. (2002). *The Aarhus Study*. *Environment*.

Bijker, W. E. (1997). *Of bicycles, bakelites, and bulbs. Toward a theory of sociotechnical change.* (T. M. Press, Ed.). London.

Burkhardt, J. E., & Shaffer, M. T. (1972). Social and psychological impacts of transportation improvements. *Transportation*, *1*(2), 207-226. doi: 10.1007/BF00167999.

Cervero, R. (1996). Paradigm shift: from automobility to accessibility planning.

Commission, E. (2002). Integration of environment into transport policy . From strategies to good practice. *Highlights from the Conference on Good Practice in Integration of Environment into Transport Policy,*.

Cross, R., & Israelit, S. (2000). *Strategic learning in a knowledge economy. Individual, collective and organizational learning process*.

Danish Ministry of the Environment. (2007). *Spatial planning in Denmark*.

Denisi, A. S., Hitt, M. A., & Jackson, S. E. (2003). *Managing Knowledge for Sustained Competitive Advantage: Designing Strategies for Effective Human Resource Management*. *Change* (pp. 3-34).

Desrochers, P., & Hospers, G.-J. (2007). Cities and the Economic Development of Nations : An Essay on Jane Jacobs ' Contribution to Economic Theory *. *Canadian Journal of Regional Science*, *30*, 115-130.

European Commission. (2009). *A sustainable future for transport. Towards an integrated, technology-led and user-friendly system. System.*

European Environment Agency. (2005). *Environmental policy integration in Europe. State of play and an evaluation framework*.

European Environment Agency. (2006). *Urban Sprawl in Europe. The ignored challenge*. *Planning Practice and Research* (Vol. 25, pp. 273-274). doi: 10.1080/02697451003740312.

Fiorino, D. J. (2001). Environmental Policy As Learning: A New View of an Old Landscape. *Public Administration Review*, *61*(3), 322-334. doi: 10.1111/0033-3352.00033.

Frank, R. H. (2005). Positional Externalities Cause Large and Preventable Welfare Losses. *American Economic Review*, *95*(2), 137-141. doi: 10.1257/000282805774670392.

Gregersen, B., & Johnson, B. (2010). Stimulating emerging sustainable energy technologies through policy learning. *13th Conference of the International Joseph A. Schumpeter Society: Innovation, Organisation, Sustainability and Crises*. Aalborg. Retrieved from http://vbn.aau.dk/files/35898458/Gregersen-Johnson_Schumpeter2010b.pdf.

Jensen, M. B., Johnson, B., Lorenz, E., & Lundvall, B. Å. (2007). Forms of knowledge and modes of innovation. *Research Policy*, *36*(5), 680–693. Elsevier. doi: 10.1016/j.respol.2007.01.006.

Johansson, F. (2006). *The Medici Effect*. (H. B. S. Press, Ed.). Retrieved from www.themedicieffect.com/downloads/MediciEffect.pdf.

Kivimaa, P., & Mickwitz, P. (2006). The challenge of greening technologies—Environmental policy integration in Finnish technology policies. *Research Policy*, *35*(5), 729-744. doi: 10.1016/j.respol.2006.03.006.

Lafferty, W., & Hovden, E. (2003). Environmental policy integration: towards an analytical framework. *Environmental Politics*, *12*(3), 1-22. doi: 10.1080/0964401042331308254.

Lam, A. (2005). Organizational innovation. *The Oxford Handbook of innovation*.

Lorenz, E., & Lundvall, B. Å. (2007). Modes of Innovation and Knowledge Taxonomies in the Learning economy. *CAS workshop in Innovation in Firms.* (Vol. 175). Oslo.

Lundvall, B. Å., & Johnson, B. (1994). The learning economy. *Journal of industry studies*.

Luttmer, E. F. P. (2005). Neighbors as Negatives: Relative Earnings and Well-Being. *The Quarterly Journal of Economics*, *120*(3), 963-1002. doi: 10.1162/003355305774268255.

Mickwitz, P., Aix, F., Beck, S., Carss, D., Ferrand, N., Gorg, C., et al. (2009). *Climate Policy Integration, Coherence and Governance* (PEER Repor.). Helsinki: Partnership fo European Environmental Research.

Mickwitz, P., & Kivimaa, P. (2007). Evaluating Policy Integration: The Case of Policies for Environmentally Friendlier Technological Innovations. *Evaluation*, *13*(1), 68-86. doi: 10.1177/1356389007073682.

Nelson, R. R. (2004). The market economy and the scientific commons. *Research policy*.

Nelson, R. R., & Sidney, W. G. (1982). *An Evolutionary Theory of Economic Change*. (B. Press, Ed.).

Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, *5*(1), 1.

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford Press.

Nonaka, I., & Von Krogh, G. (2009). Perspective--Tacit Knowledge and Knowledge Conversion: Controversy and Advancement in Organizational Knowledge Creation Theory. *Organization Science*, *20*(3), 635-652. doi: 10.1287/orsc.1080.0412.

Persson, Å. (2007). Different perspectives on EPI. *Environmental policy integration in practice. Shaping institutions for learning*.

Polanyi, M. (1966). *The Tacit Dimension*. London: University of Chicago Press.

Saelens, B. E., Sallis, J. F., & Frank, L. D. (2003). Environmental correlates of walking and cycling: findings from the transportation, urban design, and planning literatures. *The Society of Behavioral Medicine*, *25*(2), 80-91. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/12704009.

Wolfe, D. A., & Bramwell, A. (2008). Innovation, Creativity and Governance: Social Dynamics of Economic Performance in City-Regions. *Innovation: Management, Policy, Practice*, *10*, 3.

Yin, R. (2003). *Case study research: Design and methods*. *to qualitative methods in organizational research* (3rd ed.). London: Sage Publications.

Zahra, S. A., & Gerard, G. (2002). Absorptive capacity A review, reconceptualization and extension. *Academy of Management Review*, *27*(2), 185-203. Retrieved from http://frontiers.sauder.ubc.ca/Zahra_George_AMR_2002.pdf.

Århus Kommune. (2010). Knowledge for growth. Business development plan. Vision 2030. Initiatives 2010-2011. *City*. Århus: City of Århus.