Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Thomas van Daalhuizen
Student number	4598105

Studio		
Name / Theme	Planning Complex cities	
Main mentor	Roberto Rocco	Spatial Planning & Strategies
Second mentor	Victor Muñoz Sanz	Urban Design
Argumentation of choice of the studio	The last few years studying my interest is going towards circularity/sustainability and the impact these ambitious goals have on our built environment. During my masters I looked at how we can create a circular construction sector in Zuid-Holland, but also did research on what type of barriers or enablers exist to get stakeholders to make more environmentally friendly decisions. I have always felt the need to bring together the people needed to make the changes we need to create a liveable future. So far one thing I know for sure and that is that we have to look at different scale levels to achieve these goals and that we need many different stakeholders to start with important systemic changes. This interest also made me decide to not only do the Urbanism track but to do MBE as well. As I have finished both the first years of the MBE and Urbanism tracks, I tend to look at problems both from a spatial lens as well as an institutional lens. This leads to my first choice of the *studio Planning Complex Cities*. The studio investigates planning schemes, governance arrangement and civil engagements and tries to link the institutional and spatial analysis. Awareness for a sustainable just future has been increasing. With the current challenges in the world the European Union has drafted an aspiring plan which they put to paper in the European Green Deal. As such institutions have a huge impact on how our built environment looks it will inevitably create spatial conflicts. One of the main topics is mobility and especially the emissions originating from car traffic. Therefore, the European Commision has set the goal to decrease the use of cars with 75 percent, replacing it with more public transport and making use of the waterways. This drastic change will not only call for the expansion of existing networks, but also means we must	

	redesign many of our neighbourhoods to support this change. Furthermore, the residents and many other stakeholders have to be included to make this transition a success. During my thesis I want to further develop my skills focusing on stakeholder management, policy analysis, institutional changes, and regional spatial development. I can see this thesis resulting in a strategy to guide this transition from a more car-centric society to a new standard. Part of this strategy could be different patterns that can be used to transform the built environment to support this change as well as considering the process.

Graduation project	
Title of the graduation project	**Reconfiguring travel patterns** The necessary rapid just transition to car-free urban planning in a cross-border context
Goal	
Location:	Cross-border region of NL-BE, Specifically Limburg and Zeeuws-Vlaanderen
The posed problem,	According to the present paradigm, entire cities have been planned so that every resident may travel by personal automobile (Kherdeen, 2021). The use of cars does not only create health hazards but pollutes the surrounding environment and presents several challenges in terms of the use of urban space for infrastructure, a scarce commodity (Ding et al., 2022). Besides that the new trend to transition to electric cars creates demand for scarce raw materials such as cobalt inevitably creating a new cycle in which we use materials from a non-renewable source for our new way of "sustainable" transport (Kherdeen, 2021; Tabuchi & Plumer, 2021). We therefore need a paradigm shift towards a built environment where we try to implement the goal set by the European Commission of transitioning to a zero-carbon mobility network. The first milestone is to reduce the amount of car trips with 75 percent by the year 2050. This drastic change will not only call for the expansion of existing networks of alternative means of transport, but also means we must redesign many of our neighbourhoods to support this change. Furthermore, the residents and many other stakeholders must be included to make this transition inclusive so that policy and projects are supported and there is compliance with possible regulations.

	But achieving this transformation is easier said than done. In cities, the sustainable transformation of transport systems is often constrained by barriers of rebound effects, conflicting visions at different levels and lack of consensus among stakeholders leading to continued planning for cars (Nikulina et al., 2019). Border regions are lacking public transport infrastructure as well as the agglomeration benefits that many other cities have due to their location. It therefore that these regions in particular are vulnerable to changes in accessibility to services and job opportunities when changing transportation modes. Cross-border cooperation and breaking down barriers caused by borders could help to support this change in mobility in cross border regions.
research questions and	What transitional strategy can contribute to achieve a just and sustainable multimodal network in a cross-border context? Sub Questions 1. How has regional mobility evolved in the last 100 years? 2. What are current travel patterns in the cross-border region of Netherlands and Belgium? 3. How do the planning systems in The Netherlands and Belgium support different travel modes? 4. What spatial and policy conditions have to be present to make a just transition towards a new mobility network in a cross-border context? 5. What will be the implications of the mobility transition on the spatial and social sustainability in the region?
design assignment in which these result.	Designing a transition strategy to guide the mobility transition that will lead to a just and sustainable multi-modal network. **Objectives** Some of the main objectives this research hopes to put forth are: Bridging the current knowledge gaps on policy development, institutionalisation of planning capacity and social sustainability in mobility planning. Furthermore the lack of attention to

	urban processes when it comes to transition is socio-technical systems will be addressed; Understand the patterns of cross-border travel and their impact on relation between the regions; Exploring how to use the socio-technical system approach to understand mobility systems in a cross-border context; The creation of a regional vision to facilitate a mobility transition while taking into account the needs of citizens and other stakeholders; The development a transition strategy that can be operationalised with a pattern language that supports the mobility transition. The patterns can be used at different scales, for instance regional, city, neighbourhood and street, but also in terms of policy-making; Adapting a pattern language into a strategic design to support the mobility transition; Testing the developed pattern language in other areas along the border to discover its applicability in different conditions; Producing a framework for policy integration in cross-border regions with an impactful sustainability transition at hand. The sub-questions and methods that will be introduced in chapter 3 will support the development of these objectives. Hopefully addressing the coming transition that we inevitably have to start sooner rather than later. **Products** - Vision map - Regional spatial strategy - Pattern language - Strategic design - Life stories (impact) - Policy brief

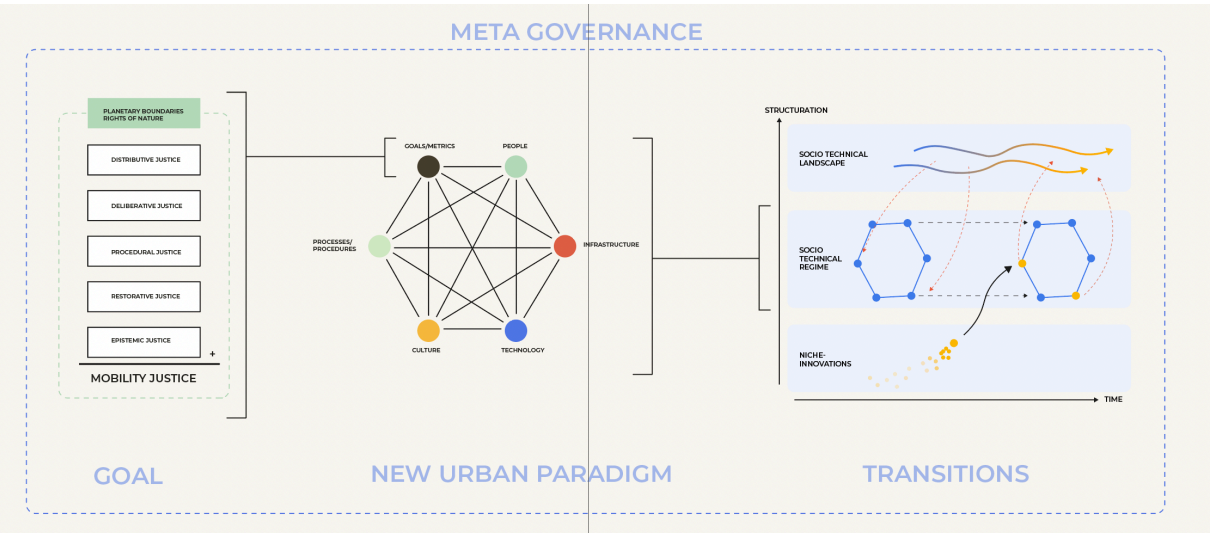
Process
Method description

Theories

There are four main theories part of this research. (1) Mobility Justice, (2) Socio-technical Systems, (3) Multi-Level Perspective and (4) Metagovernance.

Relation of theories

The mobility justice theory is concerned with exploring when the mobility options of individuals are just. This theory draws on 5 different concepts of justice (Sheller, 2018)and can be seen as the goal of the transition strategy, achieving a just mobility network with regards to the planetary boundaries. The mobility justice theory ties into the Socio-technical Systems theory. A socio-technical system consist of 6 different aspects (Davis et al., 2014) of which one is the goal that the system is trying to achieve. The system this thesis focusses on is the urban system in which infrastructure and mobility play an important role. This system approach is introduced as the new urban paradigm. Looking at cities as a system is needed in order to account for their complexity (Cilliers, 1999; Cooper et al., 1971; UN Habitat, 2012, 2016). In order to transition socio-technical systems (STS) the Multi-Level Perspective (MLP) introduces a model to destabilise the current regime, in this case the socio-technical system, and create room for innovations (Geels, 2011). The STS is part of the MLP as it the regime that we are trying to change. The last theory but just as important theory is the governance framework in which this process will play out. For complex systems and transitions a tailor-made governance approach is needed (Meuleman, 2019), in other words a metagovernance approach.



Methodology

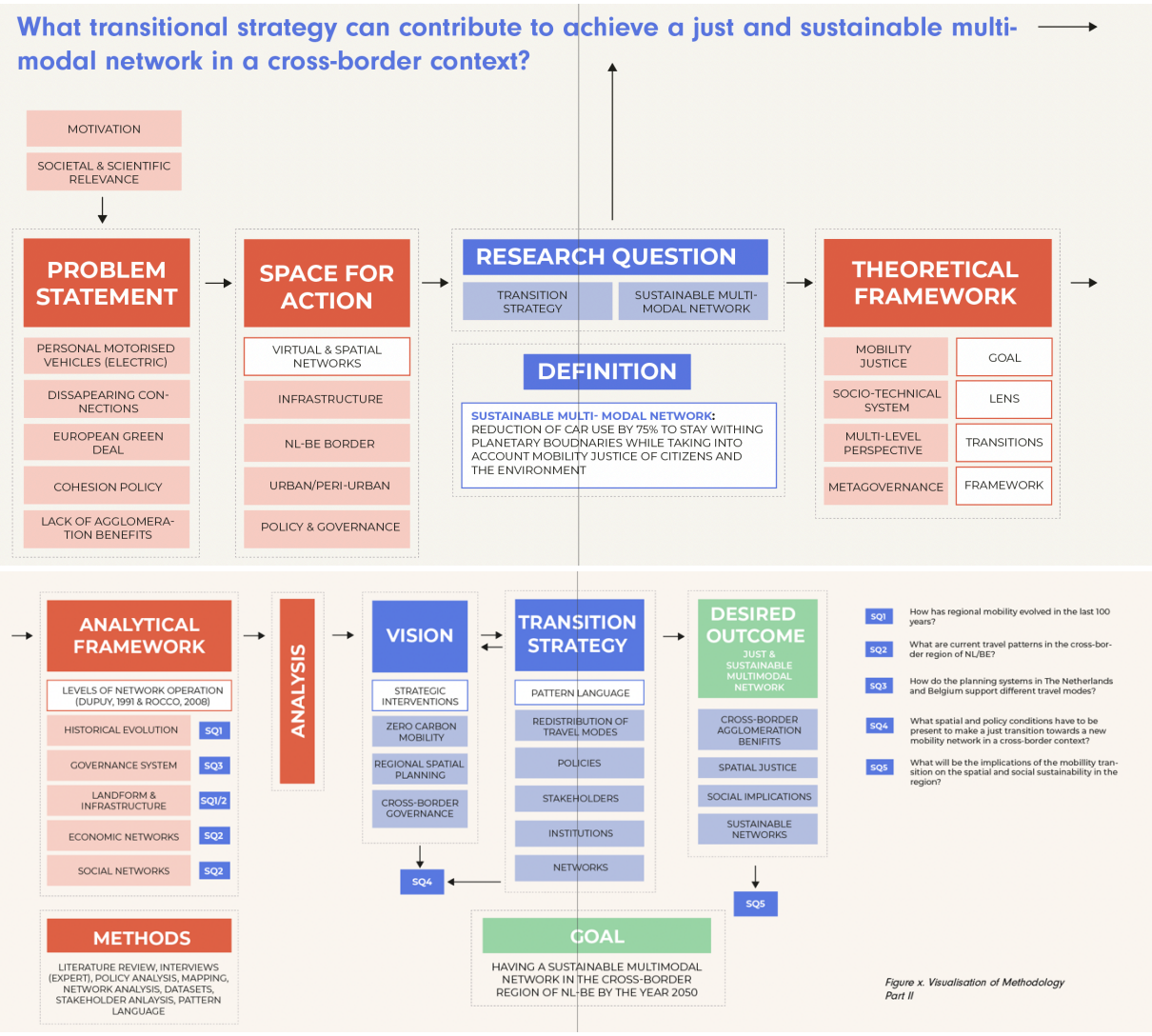


Figure x. Visualisation of Methodology Part II

After the theory is explained the location of this thesis, the border region of Belgium and the Netherlands can be further investigated. This analytical framework aims to answer sub questions in order to answer the research question. Sub question 1, 2 and 3 will mostly be answered by the analysis that will be carried out by using the levels of network operation approach. For a more detailed description of this method see chapter 2.3.

Following the analysis a vision for strategic locations based on the analysis can be drawn up. This vision will have three main pillars, zero carbon mobility, regional spatial planning, and cross-border governance structure. Zero carbon mobility is an operationalisation of sustainable multi-modal networks.

Based on the vision and the analysis a transition strategy will be designed. The transition theory draws from the theories introduced earlier and will have as a main component the pattern language. This pattern language will form the design element in the strategy. The strategy will incorporate, a redistribution of travel modes, use of policies, stakeholder engagement, the involvement of institutions and the development of new networks. The

transition strategy aims to reach the goal: Having a sustainable multi-modal network in the cross-border region of NL-BE by the year of 2050.
The desired outcome is the end result of the project and will be used to answer the last sub question. This sub question looks into the implications of the newly developed network on both spatial and social justice. This whole process will ensure the ability to answer the main research question.

Methods

Literature Research

One of the most important methods throughout this thesis is literature research. Literature research was carried out to introduce the problem field and will form the basis of the theoretical framework. Therefore, it explores current trends and concepts that are concerned with mobility transitions in an urban and peri-urban context. Besides that, literature research is necessary to do the analysis (SQ1,2&3) of the study area based on the network levels of operation approach (Dupuy, 1991; Rocco, 2008).

Interviews (focus groups)

In impactful transitions such as mobility involve "entrepreneurial capacity as well as structuring knowledge for action"(Nevens et al., 2013). An urban challenge like a mobility transition requires knowledge networks consisting of both experts and locals in order to produce answers the problem and think of potential solutions relevant for their specific context (Chang et al., 2018). Interviews held with participating stakeholders will help to confirm the results from the analysis or even open new doors of research. It is important to both interview experts and locals. Experts can help to steer the project. Obtaining more knowledge current processes and decisions will contribute to a better understanding of the problem field. Interviews with experts can also provide useful tools to include in the strategy. These expert interviews will be qualitative due to the nature of these interviews. It is about gathering more information and not about testing any hypotheses. Interviews with locals will provide crucial information on the location and its shortcomings regarding mobility. These interviews will also help to map the motives that residents have to cross the border as well as what type of transportation method they prefer (SQ2). As a follow-up on the interviews a focus groups, regarding the development and impact of the transition strategy could be organised (SQ4,5)

Policy analysis

Policy analysis in an urban planning context involves evaluating and assessing the effectiveness of different policies and strategies related to the development and management of cities and urban areas. This may include analyzing the potential impacts of land use regulations, transportation plans, housing policies, and other initiatives on issues such as economic development, social equity, and environmental sustainability. Research, through policy analysis, can suggest new alternatives and can reveal conflict and incompatibilities that currently happening within the policy frameworks of the Dutch and Belgian governments (SQ3). It can reveal appropriate and inappropriate policy instruments and furthermore, it can

help to ensure that solving one problem will not give rise to a more serious one (Bracken, 2014) .The goal of policy analysis in urban planning is to provide decision-makers with the information and insights they need to make informed choices about how to best manage and shape the growth and development of their communities. This may include identifying best practices from other cities, as well as recommending new policies or changes to existing policies to address specific challenges or opportunities.

Mapping

Mapping is a crucial tool in urban planning and design and will be used throughout this research. It allows planners and designers to visualize the physical and functional characteristics of a city or neighborhood, as well as its potential for future development. Maps can be used to identify patterns of land use, transportation, demographics, and other factors that shape the built environment (SQ 1 t/m 5).

One common type of mapping used in urban planning is GIS (Geographic Information Systems) mapping, which uses digital technology to overlay multiple layers of data onto a base map. It support the analysis and helps to compare different pieces of information in a visual format, and make informed decisions about land use and development (Longley, 2015).

Network analysis

In urban planning, network analysis can be used to study the connections and relationships between different elements of the built environment, such as transportation networks, land use patterns, and social networks (Borgatti et al., 2018; Haggett, 1965; Watts, 2004). Besides physical networks there are also always social and economic networks part of the context. A social network analysis can be used to study the connections and relationships between different groups in the community, such as neighborhoods or demographics (Lin, 2007). An economic network analysis can be used to study the connections and relationships between different economic actors within a city, such as businesses, workers, and consumers (Goyal, 2009). Each of these types of network analysis correspond with different layers in the analytical framework.

By using these techniques, it is possible to gain a better understanding of the connections and relationships between different elements of the location, which can help inform decision-making and policy development (SQ1,2&3).

Datasets

During the research datasets will play an important role to carry out the different methods. For methods such as mapping and network analysis data is necessary. Therefore, there will be no direct data analysis but rather data forming the basis of other analyses methods.

Stakeholder analysis

Considering and understanding stakeholders and then acting to engage them is generally agreed as being one of the most critical parts of any managed change initiative (Murray-Webster & Simon, 2006). Therefore doing a stakeholder analysis is neccesary. A Stakeholder analysis is the process of identifying and assessing the interests, influence, and impact of different groups of people who have a stake in a proposed urban development project. Stakeholders can include residents, business owners, community organizations, government agencies, and other groups that may be affected by the mobility transition. Creating a power-interest matrix will help to understand the role each stakeholder must play in the transition strategy. An additional layer to include in this type of analysis is the attitude. The information gathered through stakeholder analysis can be used to develop strategies (SQ 4) for engaging and involving stakeholders at the right moment in the transition process and to make more informed decisions.

Pattern language

A pattern language is a method of describing good design practices for a particular problem field, such as addressing mobility transitions in cross-border regions. It is a set of interconnected patterns, each of which describes a problem and a solution that can be applied in a variety of contexts (Alexander, 1977). The thought behind a pattern language is that the patterns can be used together to create a coherent and holistic design, rather than just a collection of isolated solutions (SQ4).

In urban planning, a pattern language can be used to describe the layout and organization of a city or neighborhood (Alexander et al., 1977). Examples of patterns could be "Street Hierarchy" which describes the different types of streets and how they should be connected (Gehl, 2010), "Mixed Use" which describes how different types of buildings and uses should be integrated in a neighborhood (Duany et al., 2010), and "Transit Hub" which describes how public transportation should be integrated into a city (Cervero, 1998).
By using a pattern language, urban planners can create more livable, sustainable, and functional cities (Alexander et al., 1977). It gives a structure to the design process, and allows the designer to think of the city as a whole system, rather than just a collection of unrelated parts (Jacobs, 1992). Furthermore, it can be used as tool of communication and co-creation. This makes the development of a pattern language an open process where not only the designer develops the solutions, but other interested parties are welcomed to add to the body of knowledge.

Literature and general practical preference

All references are included at the end of the Graduation Plan

Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

In my current studio, Planning Complex Cities, the challenge of transition to a sustainable mobility network is very much approached from a regional scale. An extra layer added is the cross-border context. However, it still requires moving through the scales to find the strategy that might help with a mobility transition. This is one of the most important skills taught in the Urbanims track. The different policies, systems and types of governance that influence decision making throughout the scales is a focal point in the research, showing the connection with the studio topic of planning complex cities. To make systemic change all these scales are important and should be seen as connected. Besides that, this studio has a large focus on stakeholders/actors involved with the project, which is an important topic in the other master I am currently doing, MBE. As the transition to a sustainable mobility network will affect many different stakeholders this studio would aim to develop a strategy to make that change happen while taking into account the impact on stakeholders.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

Scientific Relevance

Moving towards a more sustainable future has become increasingly important. Getting to the goal of a zero-carbon society has many challenges of which one is sustainable mobility. The thesis topic hopes to add to the body of knowledge on how to transition to a zero-carbon network especially focusing on border regions. These regions are usually the ones that see the disappearance of services and job opportunities which creates a need to travel longer distances. One part of the transition is to change the network but the other is to discover the relations between origin and destination. Euregions have big opportunities to support this transition by means of the services and jobs they can provide in a cross-border context. Besides that, studies have stated that the current knowledge gap is (1) missing information on behavioural changes when transitioning into a new mobility network, (2) the difficulties of policy development that support these changes, (3) the institutionalisation of planning capacity and (4) social sustainability in mobility planning (Nikulina et al., 2019). Another relevant theory this thesis can add to is the Multi-Level Perspective as there is a lack of attention in studies for the urban dimension of sociotechnical regimes and innovation-oriented policies (Coutard & Guy, 2007; Hommels, 2005; Monstadt, 2009). This thesis hopes to contribute to bridging that knowledge gap.

Societal Relevance

Another part of this thesis is on how residents of border regions can be included in the transition process. The transition has to be inclusive so that policy and projects are supported and there is compliance with possible regulations. This thesis could provide a strategy that ensures that future changes are done in an inclusive way considering the needs of residents as well as creating the much-needed support to complete the transition towards a more sustainable multi-modal network. Furthermore, the research can help contribute to the development of cross-border regions as frontrunners in sustainable multi-modal transport networks. Not only focusing on the infrastructure aspect but even more on increasing the social capacity of the region by providing mobility justice.

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