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	Anyi Yan
Student number	5558220

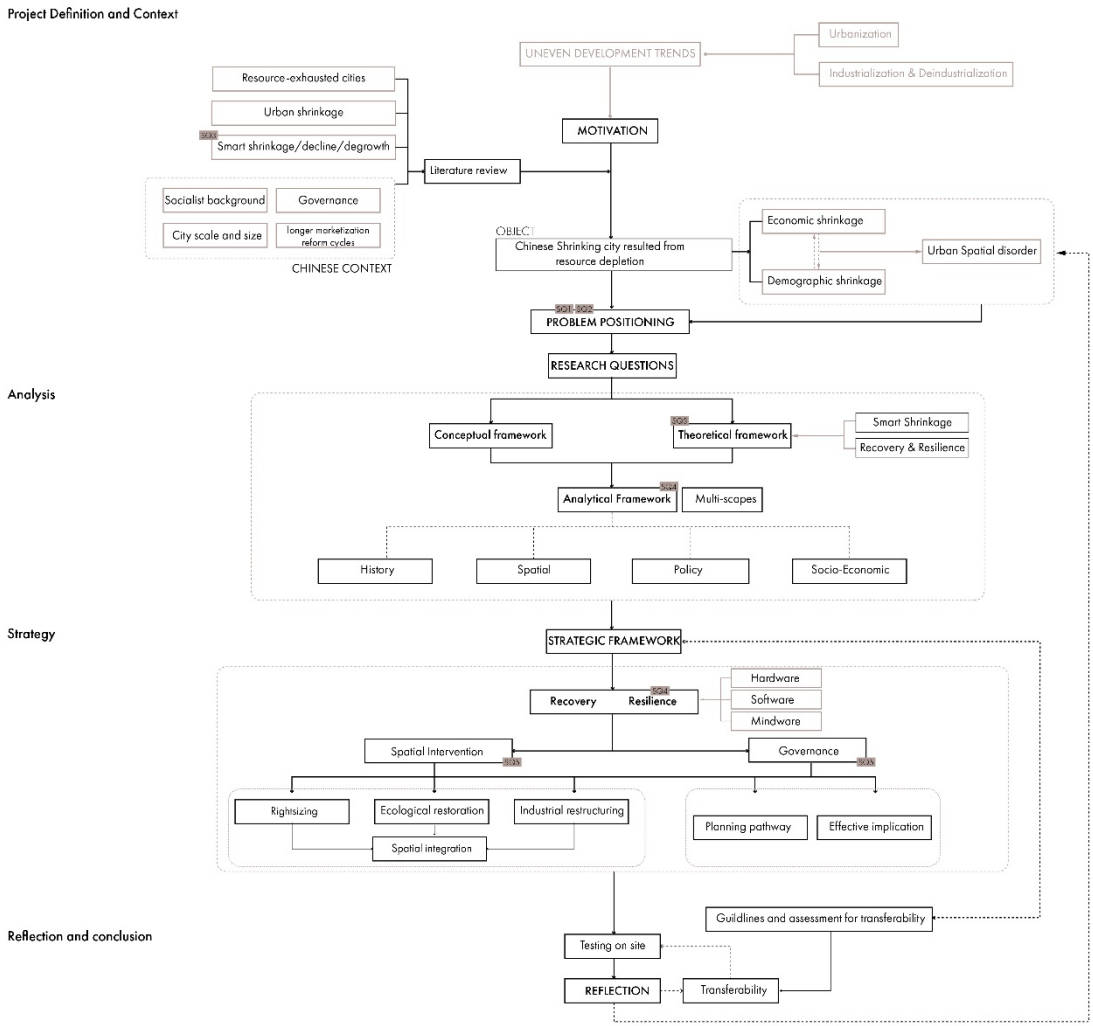
Studio		
Name / Theme	Planning complex cities	
Main mentor	Dr. Rodrigo Viseu Cardoso	Spatial planning & strategy
Second mentor	Dr. Claudiu Forgaci	Urban design
Argumentation of choice of the studio	Urban revitalization and industrial cities have always intrigued me. Resource-based cities, a unique group of problematic cities in China, were once cities built and developed because they sat on rich resources, but now they face the challenge of urban shrinkage due to China's slowing economic growth, single industrial structure, and the industrial cycle's "boom and bust." How can a resource-exhausted city in shrinkage be transformed and rejuvenated? Clearly, it is not a purely spatial issue, but a complex and difficult problem entwined with sociology and economics, encompassing aspects such as urban economic transformation, regional coordination, social equity, sustainability, and so on. As a result, I believe that the workshop on complex city planning is the best fit for my theme.	

Graduation project	
Title of the graduation project	**Self-salvation in dilemma** ——Research on Urban Regenerative Planning for Resource-exhausted Cities in Socio-economic Transition from Smart Shrinkage Perspective
Goal	
Location:	Hegang city, Heilongjiang province, China
The posed problem,	Northeast China was rich in natural resources during the planned economy era, and the exploitation of a large number of resources provided a solid guarantee for China's economic development and energy supply, as well as playing an important role in China's modernization. To exploit regional resources, business units frequently choose to sit directly in mines and build

	factories, and the boundaries of industrial communities gradually expand outward until they eventually form a functional urban space throughout the mines, which serves as the foundation for the formation of most resource-based cities. However, the emphasis on development rather than governance has resulted in serious "man-land" conflicts, while resource depletion has resulted in the gradual disappearance of the traditional advantages on which resource-based cities rely. Many factors, including resource depletion, a single industrial structure, insufficient innovation, and a rigid administrative system, have contributed to the sharp decline in the economic development level of resource-based cities in northeast China. Regional marginalization causes resource-exhausted cities in Northeast China to lack the endogenous power required for economic development and to be more vulnerable to economic shocks. Mine closures due to resource depletion, combined with advancements in manufacturing technology that have resulted in the use of more mechanized equipment, have resulted in a shrinking of jobs, a large number of residents losing their jobs, and a decline in average wages. Furthermore, nearly half a century of development has thrown the old mines' living areas into a crisis of land subsidence and severe collapse, and the urban living environment has deteriorated. These phenomena have resulted in a large population exodus, exposing the economy to future economic shocks. The negative impact of this population exodus feeds back into the urban economy as well as the spatial system, with shrinking cities and declining urban populations leading to reduced demand and oversupply of infrastructure and housing facilities for urban residents, rising housing vacancy rates, and significant land waste, exacerbating existing social and economic problems. The Northeast and resource-exhausted cities are in urgent need of transformation. All along, coalitions of local political and social elites in the United States have formed the "urban growth machine," and as a result, the growth-oriented paradigm has become the mainstream of urban governance (Logan & Molotch, 1987), and this growth-oriented paradigm has been widely accepted in China (Wu, 2015). However, the growing misalignment between the phenomenon of urban contraction and growth-oriented planning has resulted in a variety of issues, including excessive government financial pressure, as well as public safety,

	health, and environmental concerns. (Rybczynski & Linneman, 1999; Bernt, 2009; Hollander et al., 2009). Some scholars have recently advocated for a paradigm shift away from growth-oriented planning and toward downsizing cities (Schilling & Logan, 2008; Hollander et al., 2009), also known as smart decline/shrinkage (Hollander & Németh 2011). However, smart shrinkage remains more about conceptual debates, and while some cities have published self-proclaimed rational plans, their implementation remains a question mark. Furthermore, these discussions on the concept of smart shrinkage are more focused on cities in Western countries and are still in their early stages for smart shrinkage in China's shrinking cities.
research questions and	How can smart shrinkage be used as a transformation strategy in the resource-exhausted cities in China to recover them as resilient urban systems? Sub-questions: about the specific context analysis SQ1-What are the drivers and characteristics of shrinkage in Resource-exhausted cities in Old industrial base of Northeast China? about the historical development and previous transformation SQ2-What spatial consequences did industrialization and transformation bring to these resource-exhausted cities and what new potentials have appeared? about the theoretical and strategic framework building SQ3-What is "smart shrinkage" and how can the concept be integrated in the regenerative strategies and principles to develop resource-exhausted cities? about strategies and principles for Hegang city SQ4-What regenerative planning strategies and principles can promote the sustainable transformation that utilize the opportunities that stem from shrinkage? about the application in future transformation SQ5-How can these strategies and principles be efficiently implemented spatially and locally?
design assignment in which these result.	First of all, through historical development and literature review, analyze the context, causes and consequences of urban shrinkage, and summarize the transformation dilemma faced by post-industrial shrinking cities facing resource depletion, which are the most characteristic among shrinking cities in China; At the same time, summarize the current methods to deal with the problem of urban shrinkage, discuss the feasibility of the concept

	of "smart shrinkage" in the Chinese context through theoretical research and analysis of the current situation, and form a theoretical framework that are adaptive to the transformation of resource-exhausted shrinking cities; Secondly, through spatial analysis, summarize the status quo of Hegang City, and define its decline in terms of population, economy, and space; combine policy overviews, explore its development potential during the shrinking process, and propose plans for different spatial elements Design principles and related strategies; Third, based on design principles and research purposes, strategically implant design and planning; propose the establishment of a cooperation sequence for planning and development stakeholders, and explore their participation time path and spatial distribution in the process of realizing planning and development, so as to ensure the success of transformation proceed smoothly; Fourth, discuss the transferability evaluation system framework for evaluating whether the strategic framework can be used in different cities in similar situations, and provide some implementation guidelines.



[This should be formulated in such a way that the graduation project can answer these questions.
The definition of the problem has to be significant to a clearly defined area of research and design.]

Process

Method description

[A description of the methods and techniques of research and design, which are going to be utilized.]

SQ1:

What are the drivers and characteristics of shrinkage in Resource-exhausted cities in Old industrial base of Northeast China?

QUESTION DEFINITION AND OBJECTIVE:

Urban shrinkage is an immensely complex process that touches on far more aspects all around the world and there are specific characteristics in different context. The first sub-question is mainly focused on the analysis of the phenomenon of urban shrinkage based on specific Chinese context. This question aims at the definition and identification of the object of the thesis and will be composed of the main part of theoretical underpinning aspect of the whole thesis.

METHOD TO BE APPLIED:

The research methods involved in this question mainly include:
Literature review: Understand the definition and significance of Resource-exhausted cities; the definition, causes and consequences of urban shrinkage; the special characteristics of Chinese context, for instance, the planning framework and hierarchy of China;
Mapping: Use maps to depict the overview of urban shrinkage trend in China in a visual way;
Statistical analysis: Use statistical data from municipal and central government to depict the overview of urban shrinkage trend in China in order to bridge the gap in spatial data;
Policy review: The central government has issued some policies related to the new urbanization construction to take the shrinking cities into consideration and some policies related to the regional development.

RESOURCE MATERIAL AND DATA:

Existing literature on urban shrinkage, resource-exhausted cities and Chinese context;
The revitalization planning of old industrial base of northeast China;
Key tasks of new urbanization construction in 2019;
Geographic data and GIS database;
Statistical data of statistical yearbook from municipal government and from website;

SQ2:

What spatial consequences did industrialization and transformation bring to these resource-exhausted cities and what new potentials have appeared?

QUESTION DEFINITION AND OBJECTIVE:

The second sub-research question, on the one hand, is an analysis of the historical development and status quo, where the existing challenges and problems can be summarized; on the other hand, it is considered as exploration of the potential goals and policy preferences of the shrinking resource-exhausted cities, where the government's understanding and attitude towards those cities can be noticed. Spatial regeneration is one of the main aspects of this thesis, since planning and designing are usually reflected by the interventions in space, so it is also considered as one of the opportunities to achieve the research aims. Therefore, this question helps conduct the development of strategic framework and test the applicability in specific location.

METHOD TO BE APPLIED:

The research methods involved in this question mainly include:
Literature review: Understand the industrialization and urbanization process in China; the status quo of industrialization in post-industrial era;
Case study: Collect the cases of the resource-exhausted cities that are facing the transformation and their reaction;
Mapping: Use maps to demonstrate the spatial consequences in the study site Hegang city;
Statistical analysis: Use statistical data from municipal and central government to depict the potentials and policy preferences;
Policy review: Study policies issued by the central government that guide the new urbanization construction; review the overall planning of specific cities to find the potentials of future development.

RESOURCE MATERIAL AND DATA:

Existing literature on Chinese urbanization and industrialization process;
The overall planning of some of the resource-exhausted cities, especially Hegang City;
Key tasks of new urbanization construction in 2019;
GIS database and open data from website;
Statistical data of statistical yearbook from municipal government and from website;

SQ3:

What is "smart shrinkage" and how can the concept be integrated in the regenerative strategies and principles to develop resource-exhausted cities?

QUESTION DEFINITION AND OBJECTIVE:

This sub-research question is the theoretical research. Smart shrinkage, one of the main concepts in the project, is actually not a well-known and widely used concept. In order to implement this approach, the new and logical understanding of this concept is necessary. In this question, combined with new interpretation of recovery and resilience, the theoretical framework will be built; It can help evaluate and integrate the principles and strategies extracted from the literature review, and finally help to establish a transformation strategic framework of smart shrinkage related to study site.

METHOD TO BE APPLIED:

The research methods involved in this question mainly include:
Literature review: *[combined with Case Study]* Study the strategies of coping with shrinkage in different context; understand the meaning of smart shrinkage, as well as the strategies and principles based on smart shrinkage; understand the definition and theory of resilience and adaptive cycle; understand the concept and definition of recovery, and redevelop it based on the project; study and explore the concept of livability and urban vitality and their evaluation criteria;
Case study: Collect the cases of cities that are facing shrinkage and their reactions; the implementation of smart shrinkage;
Research by design: Develop the guidelines of smart shrinkage that adaptive to Chinese context in Hegang city based on the summary of case study and literature review;

RESOURCE MATERIAL AND DATA:

Existing literature on how to cope with shrinkage in different cases;
Existing literature on smart shrinkage;
Existing literature on resilience and recovery;
Existing literature on urban vitality and livability;

SQ4:

What regenerative planning strategies and principles can promote the sustainable transformation that utilize the opportunities that stem from shrinkage?

QUESTION DEFINITION AND OBJECTIVE:

This sub-question mainly studies the regenerative strategies and principles to promote Hegang's sustainable transformation based on the theoretical framework and analytical framework. The purpose of this research question is to formulate a strategic framework and master plan through the previous research for the transformation, combining its own development potentials and policy support from government.

METHOD TO BE APPLIED:

The research methods involved in this question mainly include:
Case study
Mapping: Use the data and maps to position the problems in Hegang City;
Research by design: Combine the analysis with strategies and principles;
Policy review: Explore the potentials and opportunities from the policies in regional and local scale;

RESOURCE MATERIAL AND DATA:

GIS database and open data from website in Hegang scale;
Theoretical research and framework;
Vision building for the project;

SQ5:

How can these strategies and principles be efficiently implemented spatially and locally?

QUESTION DEFINITION AND OBJECTIVE:

The last sub-question will continue to focus on the local scale. On the one hand, testing whether the planning strategies can be implemented in the local scale and can promote the transformation to get the spatial regeneration; on the other hand, explore the stakeholder engagement in the implementation process and explore the possibilities of cooperation between different departments to form the steps to realize the future vision.

METHOD TO BE APPLIED:

The research methods involved in this question mainly include:
Literature review: Study the theory of empower, governance and social inclusiveness;
Case study: Study the regenerative planning cases; study the co-governance practices;
Mapping: Use the maps to point the potential design area and help locate the strategies in Hegang City;
Research by design: Use the design language to depict the strategies and principles;
Policy review: Explore relationship between departments that are regulated in the policies and explore potential cooperation in the planning;
Stakeholder analysis: Discuss the stakeholders that may be involved in the implementation of the plan and explore the relationships between them;

RESOURCE MATERIAL AND DATA:

Existing literature on governance and co-governance;
Satellite map and analysis in Hegang scale;
Overall planning of Hegang city and development planning documents;

Literature and general practical preference

[The literature (theories or research data) and general practical experience/precedent you intend to consult.]

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- He, S.Y., Lee, J., Zhou, T., & Wu, D. (2017). Shrinking cities and resource-based economy: The economic restructuring in China's mining cities. Cities, 60, 75-83.
- Justin B. Hollander & Jeremy Németh, 2011. "The bounds of smart decline: a foundational theory for planning shrinking cities," Housing Policy Debate, Taylor & Francis Journals, vol. 21(3), pages 349-367, June.
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- Anja B. Nelle (2016) Tackling human capital loss in shrinking cities: urban development and secondary school improvement in Eastern Germany, European Planning Studies, 24:5, 865-883, DOI: 10.1080/09654313.2015.1109611

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)?

My graduation thesis is focusing on the dilemma that urban development faces in the future transformation period, and explores the possibility of its future development, which is one of the key topics in the field of urbanism; urbanism-based research provides the project with multiple levels of understanding of cities, including levels of urban built environment and economic and social analysis. In addition, PCC Studio which I chose combines spatial planning and governance schemes; in this project, through multi-faceted analysis and theoretical research on the city, urban design is used as a means to explore how to achieve the research goals from the perspective of strategic planning, which is in line with the concept of Planning Complex Cities Studio.

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

social:

Although there is currently a considerable amount of research in planning academia on the causes and consequences of urban shrinkage, as well as the principles and strategies for dealing with it, there are still some significant gaps.
First, current research on urban shrinkage and smart shrinkage is primarily based on the context of Western countries, whereas China's social institutions, economic and social development background, cultural heritage, and governance systems differ from those of Western countries; although Chinese scholars have introduced the concept and understood and reflected on it, current research in the Chinese context primarily focuses on the connotation, theory, and in European and Asian cities. However, current Chinese research is focused on the connotation, theory, and practice in European and American cities, while practice and application in Chinese cities is still in its infancy.
Second, how to develop clear and specific design principles and overall planning strategies that policymakers and practitioners can use to help the sustainable development of shrinking regions and cities on multiple levels, such as economic, social, and physical space. Under the theoretical framework of smart shrinkage, this study seeks to find more opportunities and possibilities for resource-depleted cities in contraction as well as transition dilemmas, how to tap the potential of cities and cultivate innovative industries to drive urban regeneration, how to revive urban vitality in existing decaying urban spaces, and how to become more resilient small and medium-sized cities.
Overall, the theoretical significance of this thesis lies primarily in the intention to fill a knowledge gap and enrich research in the related field.

Professional and scientific:

Due to resource depletion and regional decline, resource-based cities in northeast China's old industrial bases are experiencing unprecedented urban shrinkage, including economic decline, population decay, ecological decline, urban spatial decay, and loss of urban vitality; the cities no longer provide a good living and employment environment for their residents, and their attractiveness continues to decline, forming a vicious cycle. These cities and regions represent uninhabitable and economically healthy parts of the city, and cur-rent planning focuses more on the development of this area from the perspective of the government and policymakers, despite the fact that attention to the needs of the population in these areas is also a major concern. The use of regeneration policies to shrink and reuse existing space provides opportunities for future urban development, achieving sustainable urban re-generation, increasing attractiveness, mitigating the more deteriorating con-sequences of urban shrinkage, assisting in the improvement of the urban population's living environment, increasing employment opportunities, and so on; and even has broader social implications that can inform the development and transformation of cities.

Ethical consideration:

The first is that in order to investigate, comprehend, and solve this problem, we must learn at multiple scales, from local to larger, and even national. However, our exploration and research may be biased or neglectful. There are also context-specific issues to consider, such as historical and cultural factors.
The second is the power game, such as the competition between state-owned enterprises, the government, and the private sector, as well as the limited power and influence of planners in the Chinese planning system; it is critical to balance and coordinate among stakeholders in the Chinese political system and context.
The urban structure in China's resource-based northeastern cities is relatively homogeneous, and the type of capital is primarily state-owned enterprises (SOEs). SOEs play an indispensable role in the city, and those that have been present for many years have a strong voice in negotiations with the local government. The lack of private capital infusion in the Northeast, when compared to other regions of the country, has not only contributed to the region's low economic dynamism, but has also resulted in a decrease in the initiative and execution of green and sustainable development.
More importantly, we must think about the citizen level. Although we are aware that policies for the transformation and revitalization of these cities are primarily focused on the top level, and citizens are at a disadvantage in overall planning, and their voices are rarely heard by policymakers, we must still consider the individual level's inclusiveness in sustainable transformation.
Furthermore, because China is a developing country, economic development is the first priority, and we often overlook the importance of ecology as a result, but in the transition of resource-depleted cities, how to deal with the ecological damage caused by early mineral development is also a very essential part.