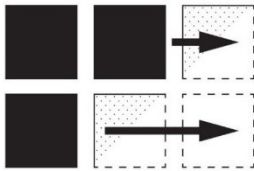
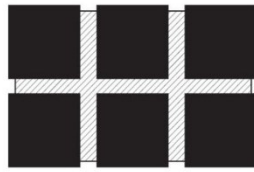


An Endurable Structure for Future Life

Investigating adaptable strategy for urban development and architecture design



Research Paln

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Introduction

Glean means to collect useful remnants of crops from a reaped field. It is a practice recorded in the Hebrew Bible that has become a legally enforced right for the impoverished in some Christian nations. It is now done by humanitarian organizations who deliver the gleaned food to the impoverished and needy in the modern society. Wherever there is a surplus of food, gleaning activities occur. Gleaning can take place at farms in the field as well as supermarkets. Excess food is a product of mass production and mass consumption to some extent. Since 20th century, the impact of Fordism and post-Fordism result in a significant difference in modern economic and social systems. It has been described as a model of economic expansion and technological progress based on mass production and the manufacture of standardized products in huge volumes using special purpose machinery and unskilled labour.¹ As Vidal has argued, Fordism was a uniquely functional accumulation regime in that it was capable of temporarily containing fundamental capitalism tendencies toward



Fig.1 Workers in Fordist factory

stagnation, but they have now been permanently unleashed under post-Fordism, which is a dysfunctional regime and it has undergone three decades of slow growth, which is mostly due to a continually low profit rate, most likely related overproduction.² In other words, Fordist production, while driving capitalist development, was also closely linked to overproduction.

As the documentary, *Les glaneurs et la glaneuse* has shown, the harvest machine only gathers standardized potatoes with a diameter of 3-4 inches, which are easy to sell in the supermarket. An average of 4,500 tons of potatoes are harvested each season, but 25 tons will be dumped.



Fig.2 Standardized potatoes



Fig.3 Dumped potatoes

In the contrary, the gleaners can find the real value of these leftovers rather than the value standardized by market. Compared to the screening system of machine, human's selection standard is more flexible and adaptable. The industrial revolution was a prerequisite for mass production, which contributes to the development of industrialized society. Historically, industrialization has resulted in urbanization by generating economic development and job possibilities that attract people to cities. If modern cities are compared to the products of

urbanization, what kind of 'screening system' would be more conducive to urban development.

Maastricht: Urban shrinkage and De-industrialization

When a factory or several factories are built within a region, a significant need for manufacturing workers is created, and urbanization starts. Other firms, such as construction makers, merchants, and service industry, then follow the factories in order to supply the employees' product demands. This generates even more jobs and housing demand, resulting in the formation of an urban area. Maastricht developed into an early industrial city in the first half of the 19th century, which led to numerous industrial expansions at that age. However, the number of employees in industry has declined sharply since the 1960s. For this reason, the center of gravity in the urban economy shifted from industrial employment to services. Like other industrial cities, Maastricht is gradually becoming a shrinking city. It locates in the area that has seen long-term population reduction, and additional decline is projected in the future. Maastricht's population is now mostly steady at roughly 123,000 people, and demographic projections indicate that this figure will continue stable. However, the city is confronted with social, economic, and geographical difficulties that are common to shrinking cities across the world.³

According to Pallagst, as jobs shift from the city centre to cheaper property on the suburbs, shrinkage occurs as a result of deindustrialization.⁴ Bontje agreed that urban development

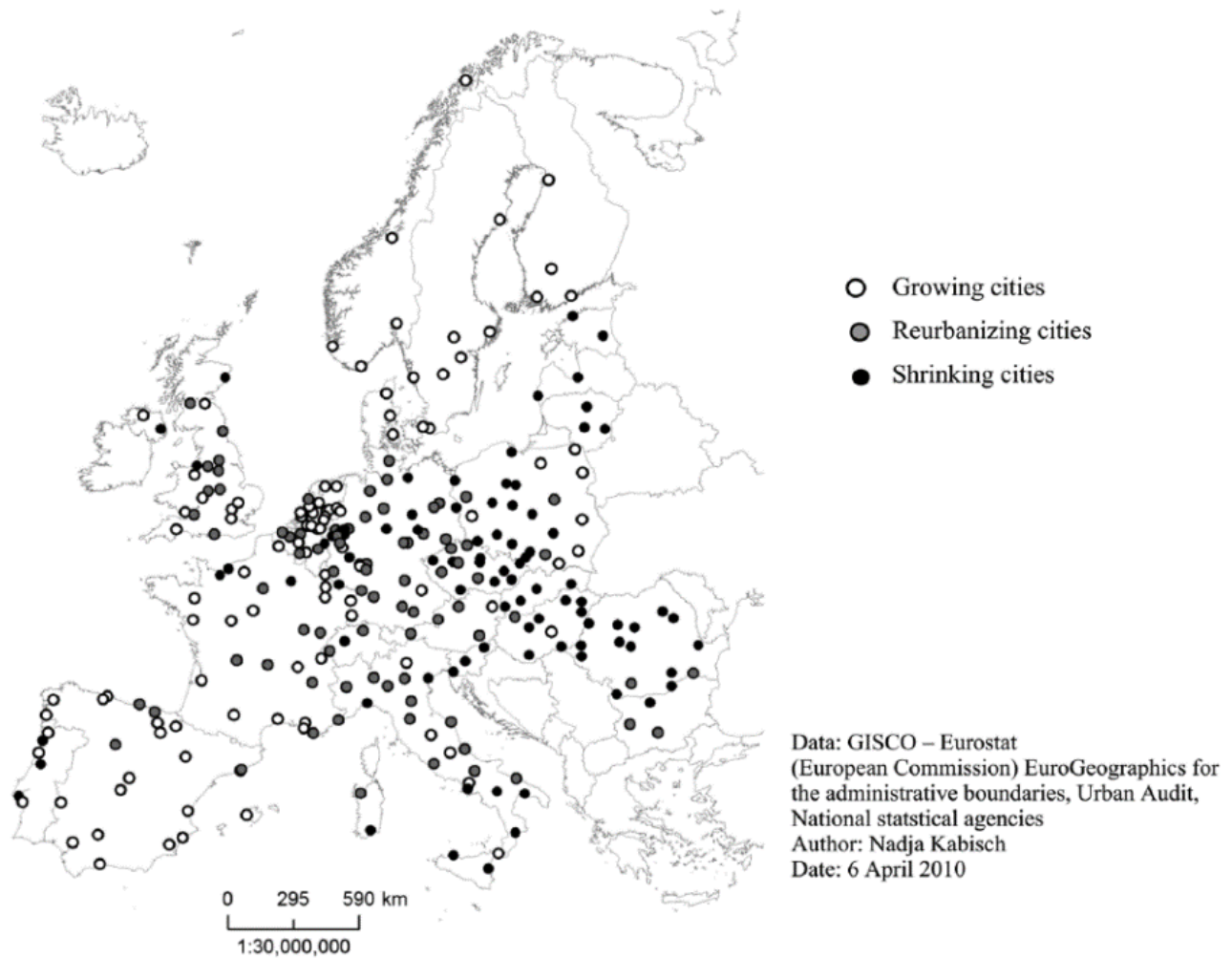


Fig.4 Shrinking cities in Europe

model which is based on Fordist model of industrialization and De-industrialization is widely attributed to urban decline. Besides, he also concluded two more factors leading to the shrinking urban development. First of all, cities that concentrate excessively emphasis on one field of economic growth, such as the car industry in Flint, are subject to quick declines. And the shock therapy model failed to protect most state-owned firms from being privatized, resulting in factory closures and the loss of a huge number of industrial jobs.⁵ Regarding to deindustrialization, it is a social and economic transformation produced by the elimination or reduction of industrial capacity or activity in a country or region, particularly in heavy industry

or manufacturing. Deindustrialization, which means the trend of disinvestment from industrial urban areas, is one hypothesis of shrinking cities. This theory is centred on post-World War II Europe, as manufacturing declined in Western Europe and increased in the United States, resulting in a shift of global economic power to the United States.⁶ Consequently, Western European industrialization largely ceased, and alternative industries arose.⁷ As an industrial city, Maastricht is facing the challenge of constant urban shrinkage, hence finding a sustainable model for urban development to adapt to changing society is the first thing that needs to be considered.

Site: Flexibility and adaptability

The paper mill used to belong Koninklijke Nederlandse Papierfabriek (KNP) which was founded in 19th century. After the Industrial Revolution, due to technological developments, machines gradually replaced human labour as the main method of producing paper. KNP built a new paper machine on the Maas in Maastricht in 1951, the PM 5, followed by the PM 6 in 1962.⁸ As machines infiltrated the workplace and employees lost authority, French historian Marc Bloch remarked that wherever labour is expensive, it must be supplemented by machines; this is the only way to compete with those nations where labour is cheap.⁹ And the factory buildings were designed for machine rather than human. As spaces of production increased in scale from small to large, a contrast between understanding space in society and the space of the factory became involved in the evolution and culture of cities. For mass production, the paper machine was designed in a huge scale. Due to the shrinkage of

industrial economy, the Sappi factory on this site don't need the same area of buildings as before to support the process of production. And these buildings are built to storage huge machine, which means it will take a lot to demolish or renovate these spaces of production on a non-human scale. Therefore, they decide to sell part of the factories to the government or other entrepreneurs for new urban development or small business. However, it is a long-term plan to deal with these useless buildings and it occupies a large area of urban land, which might become an obstacle to urban development. Based on these concerns above, the research scales down from the urban scale to the architectural scale and leads to the other primary direction of research, which will mainly focus on finding flexible and adaptable strategies to tackle spatial issues.

In terms of flexibility of the building, the unexpected human's behaviour and the construction structure of the building are the two crucial considerations leading to the final architectural design. As Kronenburg has concluded, there are four characteristics of flexible architecture: adaptation; transformation; movability; and interaction.¹⁰ Firstly, Buildings that are built to adapt to various functions, users, and climatic change meet the definition of 'adaption.' They leave enough space to cope with various changes. And 'interaction' means buildings that adapt to users' needs automatically or intuitively. It refers to buildings that utilize sensors to modify their look and surroundings, as well as buildings that use kinetic energy systems and intelligent materials. In addition, the concept of 'transform' refers to buildings that change shape, space, form, or appearance by physically altering their structure, skin, or interior surfaces and they are able to open, close, grow, and contract. Finally, movability relates to rolling, floating or flying buildings that move from one location to another in order to better serve their purpose.



Fig.5 'Adapt': Schaulager Art Warehouse, Basel

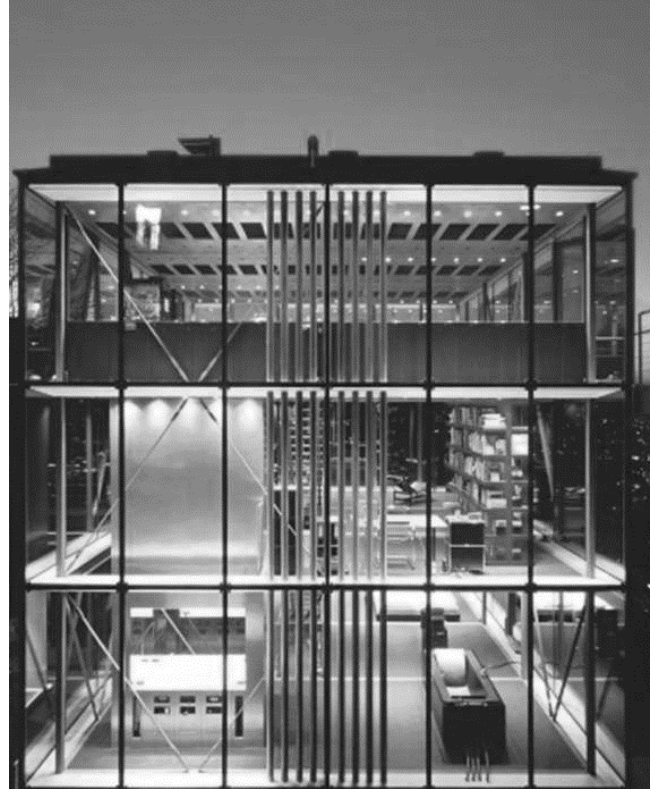


Fig.6 'Interact': House R 128, Stuttgart



Fig.7 'Transform': Starlight Theatre, Rockford



Fig.8 'Move': Nomadic Museum, New York

Research questions

As the above has described, there are two primary research questions. From a perspective of urban planning, what is the sustainable model for urban development is the first question to study. Sustainable urban development is a comprehensive notion, which includes land development with environmental protection, nature's ability to sustain human activity, the vitality of a city as a complex system, and the quality of life of its residents.¹¹ In other words, sustainable urban development comprises a wide variety of activities such as environmental preservation, human development, and inhabitant well-being. These basic ideas lead to one of the sub-questions: what are the key factors facilitating the sustainable urban development? As a phenomenon of deurbanization, shrinking city is an urban issue which cannot be neglected. Therefore, the sub-question about what kind of sustainable strategies can tackle urban shrinkage further focuses on the issue of urban development in Maastricht.

Under the concept of sustainable urban planning, how flexible architecture contribute to this development is the other equally important research question, which starts from architectural design. As Rogers has illustrated that the impact of rapid transformation on the physical form of the city is profound and it is increasingly usual to predict that a structure would outlast its intended use in a few of years.¹² Therefore, architecture no longer represents a rigid hierarchical order; instead, they have evolved into flexible containers for usage by a dynamic city. This leads to the first sub-question: What is the definition of flexible architecture in modern society. To further figure out the architectural dynamism that transcends time, how flexible architecture respond to dynamic city is the other sub-question.

Theoretical framework

The research extends on two groups of literatures. In terms of urban scale research, it is necessary to determine the ambiguous relationship between industrial city and shrinking city, which will help to find out the most effective sustainable urban strategy. *Industrial cities: history and future*, including essays which illustrate how the landscapes, images, social dynamics, and economies of the industrial city have changed through boom and bust. This could help to compare Maastricht with other industrial cities to find the common issue of urban development of industrial city, which can lead to urban shrinkage. *The Future of Shrinking Cities: Problems, Patterns and Strategies of Urban Transformation in a Global Context* can give a more comprehensive understanding of urban shrinkage and relative strategies to deal with it.

In order to study the positive influence of flexible architecture on sustainable urban development, the other two publications both focus on the interpretation of the idea of creating flexible and adaptable space. *Flexible: architecture that responds to change* explores the concept of flexible living by examining the type of built environment that can help us to sustain life on the move, which could contribute to identify the primary principles to design a flexible architecture. *Architecture and structuralism: the ordering of space* includes a new perspective to understand flexibility. The concept of 'polyvalent' space emphasizes on the competence of space to be able to handle unexpected applications and presents a hint of space for self-expression, which is called the inviting form. This idea further explains how the ordering of space and human's behaviors impact on the flexibility of architecture.

Research methods

According to Wang and Groat, history research collects facts from the past and necessitates the creation of a narrative that is holistic.¹³ Finding out the urban issue of industrial cities is the premise to answer the question about sustainable strategies for urban development. The detailed literature review of the history of industrial cities will be conducive to conclude the issue mentioned above. And the historical mapping of shrinking cities makes each stage of urban shrinkage more explicit and legible. In addition, to study the historical development of flexible architecture will further interpretate this principle of design in a comprehensive view. Besides full and accurate historical research, the analysis of a few case studies is also needed to sort out the practical situation of shrinking cities and application of design principles on flexible architecture.

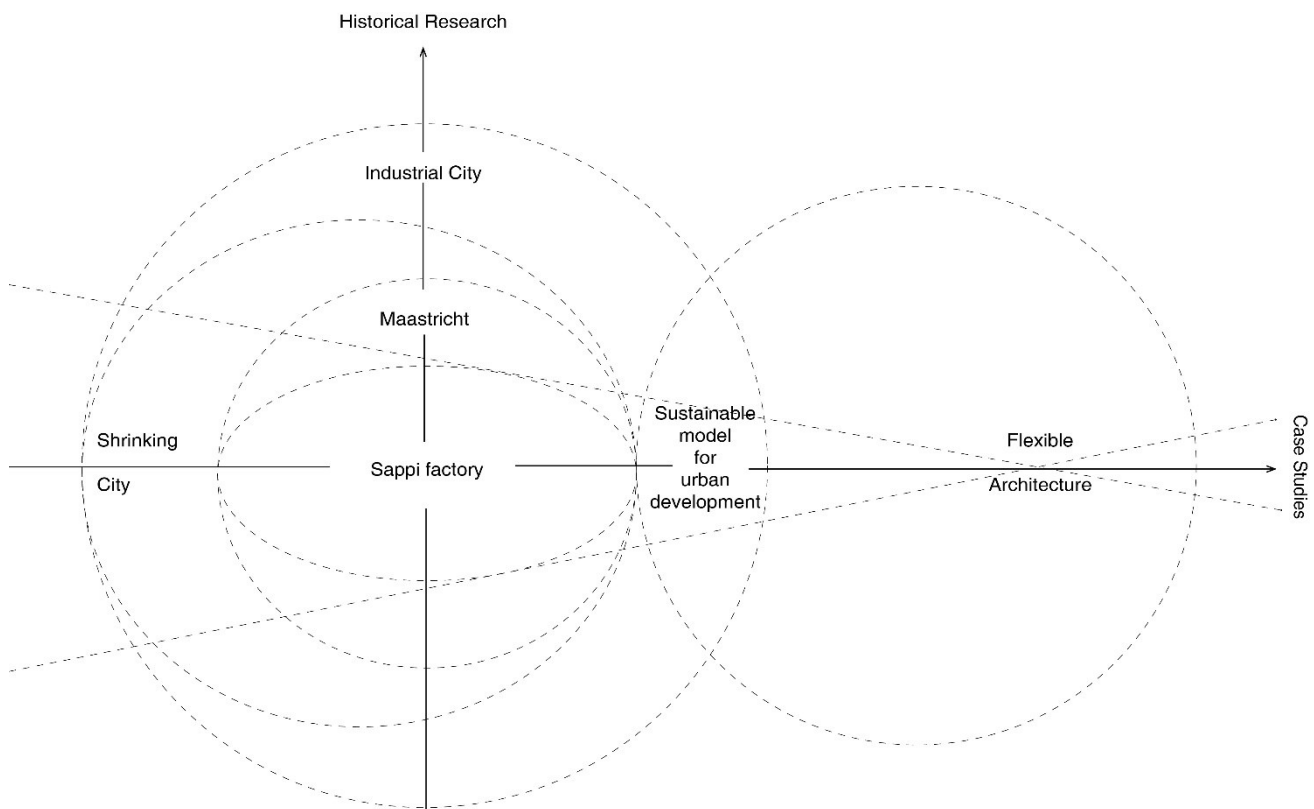


Fig.9 Methodology Framework

Endnotes

1. Tolliday, Steven, and Jonathan Zeitlin (1987). *The Automobile Industry and Its Workers: Between Fordism and Flexibility*. New York: St. Martin's Press.
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Image Captions

Fig 1 <https://www.powereng.com/library/how-might-henry-ford-evaluate-ecological-impacts>

Fig 2 by Author

Fig 3 by Author

Fig 4 <http://www.policy.hu/mykhnenko/Haaseetal2016.pdf>

Fig 5 <https://arquitecturaviva.com/works/almacen-de-arte-schaulager-basilea-8>

Fig 6 <https://juliaknz.de/post/189905844823/werner-sobek-r128-house-stuttgart-germany>

Fig 7 <https://www.arch2o.com/bengt-sjostrom-starlight-theater-studio-gang/>

Fig 8 <https://arquitecturaviva.com/works/museo-nomada-1>

Fig 9 by Author