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# URBAN TRANSFORMATION IN SEOUL AND SINGAPORE: ON THE IMPACTS OF DIGITALIZATION, MOBILITY STRATEGIES, AND URBAN GOVERNANCE

***Abstract:*** *The dynamics and extent of urban transformation appear to have been very well developed by the beginning of the 21st century. It also seems that urban digitalization strategies in Asia are hardly slowed by resistance such as in the European context, as exampled by the existing privacy concerns. However, what are the consequences when people's mobility behavior, transport infrastructure and public space are increasingly technologically connected, interconnected and becoming a part of a centrally controlled big data pool? Are there any limits to the digitalized economization or politicization of public space – and is it possibly already becoming visible in Asian metropolises? The aim is to analyze mobility issues in the context of digitalization from different perspectives.*
***Keywords:*** *urban transformation, urban development, urban big data, urban governance, mobility strategy, Seoul, Singapore.*

## Introduction

Asian cities pursue ambitious, sometimes contradictory, mobility strategies and test new approaches as if in an urban laboratory. On the one hand, highly technology-based traffic management approaches are used; on the other hand, procedures are being tested with a view to reduce selected modes of transport. The focus is different in each case: Singapore is experimenting with IT-based traffic management measures and a quantitative limitation of vehicle traffic, whereas Seoul focuses on favoring vehicle traffic and continuing road construction (see Figure 1). Isolated Korean model projects such as the promotion of urban cycling transport have not been able to bring a significant change. The requirements of growing motor vehicle transport are still the highest priority in government planning. The fact that local authorities and information and communication technologies providers collect mobility profiles of citizens, among other things, is usually seen uncritically in both cases. However, the decision which strategies are successful is also a question of the legitimacy of the stakeholders and the process of political-planning and decision-making. Up to now, the Asian technological-oriented urban and transport development strategies appear to be top-down realization processes, which largely exclude true civic participation.

## Methodology

Based on a literature analysis, significant concepts and approaches are identified from an urban-geographical perspective that dominates the current discussion. The research field defines the keywords: urban transformation, urban big data, urban governance, and urban mobility. In particular, the interactions between urban transformation in terms of digitalization, mobility strategies and urban governance will be examined. This article is limited to the selected publications that form the basis of this research area in trend-dominant the Asian cities at the beginning of the 21st century.


Figure 1. Vehicle traffic, Songdo, Seoul (Hekler M., 2016)

**Measurement and analysis**

The research field of urban transformation with a focus on the impacts of digitalization, mobility strategies, and urban governance is discussed on a local and a global scale with different strategies, objectives and concepts.

**State of research: urban infrastructure**

In concrete terms, relevant publications on the research of urban infrastructures are as follows:

An nd Kim (2015: 354-369) use the foresight method to analyze the *2030Seoul Plan*. Foresight is among others a scientific examination of long-term decision-making and planning processes in which different stakeholders are usually involved to. The *2030 Seoul Plan* includes the aspect of green transport infrastructure. The strategy is to develop a transport concept that can be done largely without the use of private vehicles. The author's critical analysis provides insight into how participatory, urban foresight has been implemented in the *2030 Seoul Plan*. "Most of the adaptive foresight components [see Weber 2006: 189-221, by the author] were not reflected in 2030 Seoul Plan" (An and Kim 2015: 367).

Zahraei et al. (2016: 135-145) uses also the foresight method to identify future urban mobility terms in Singapore. The authors mention central challenges that can potentially influence the transport policy, including, among others, a massive involvement of technology - real-time data, autonomous driving, and shared mobility.

Wolfram (2016: 121-130) describes shortcomings in the diversity of stakeholder groups involved and their inadequate transformative capabilities in the existing urban (transport) concepts. According to Wolfram (2016: 121-130), an integrated conceptual framework for aradical urban change is inevitable. The concept of urban transformation capacity seems to provide a basis for strategic orientation for urban (transport) development and planning practice.

Urban cycling transport seems to have low planning priorities in Seoul at present. Kim (2015: 886-897) highlights the potential and limitations of the urban cycling transport in Seoul, drawing on the model of multi-level perspective (MLP). It explains the dynamics of radical systemic changes of participants, institutions and practices at different levels. The analysis results show that it needs new approaches in the politicies and planning to strengthen cycling transport. Positive transformations can be developed in addition to cycling infrastructures (cycling tracks, bicycle parking lots) also by electric bicycles and app applications.

**State of the research: technology**

In this context, technology appears to be another relevant field of the research.

Chowdhury et al. (2017: 277-291) discuss big data in urban research, in particular with a focus on transport and the resulting mobility. The current state of the big data applications will be shown based on case studies in order to derive possible mobility strategies.

Furthermore, Kitchin (2014: 1-14) critically examines the effects of big data and digital infrastructures in cities. The author speaks in this context of a real-time city, based on an extensive real-time analysis. It also shows how complex the use of (geographic) data is to monitorreal-time city processes. Kitchin (2014: 1-14) points out that there is a considerable need for research here.

A vision of information and communication technology is the Internet of Things (IoT) combined with big data analytics designed to increase urban efficiency. "Data [mostly] come from different sources, such as land-use patterns, spatial organizations, environmental dynamics, transport and traffic systems, mobility and travel behavior, natural ecosystems, energy resources, building automation, infrastructures and facilities, and so on" (Bibri 2018: 230). Bibri (2018: 230-253) has developed a basis for discussing the urban challenges associated with IoT and big data analysis, as well as related issues. Significant applications are among the others in (transport) infrastructure monitoring, management, and urban planning.

Rabari and Storper (2014: 27-42) characterize a planar, networked use of sensors, a collection of different data sources and types as a digital skin that could emerge in cities in the future. "Four major dimensions of the digital skin [can be characterized], in the areas of big data, smart urban management, public participation and governance and digital intermediation of social interaction" (Rabari and Storper 2014: 28). The digital skin opens up new questions in urban theory and research as well as in urban politics. In addition, the challenge is to organize the collected data in a meaningful way to facilitate comparisons and analyze different types in cities. "Beyond the control of data itself, there is the related issue of the algorithms and systems that will be used to process and interpret the data, and thereby inform subsequent interventions" (Rabari and Storper 2014: 39).

**State of research: urban governance**

The researchof urban governance also seems significant in the context of Asia.

Wolfram (2017: 622-641) considers approaches in Seoul that deal with new governance methods and dynamics of interaction processes at the micro level. Based on research dealing with strategic niche management and grassroots innovation, interdependencies are conceptualized in the urban context. In this context, the author also raises questions about legitimacy, inclusion and a strategy, although without trying to answer them conclusively.

With regard to the transport development in Seoul, Shin and Lee (2017: 87-93) note that participation and governance could evolve. The ideas about what should a participative governance seem to be assessed differently by different participants. The inclusion and participation of citizens in the policy-making process of mobility strategies could perhaps be a formal adaptation strategy without genuine citizens' participation in decision-making processes.

Another form of the governance is Public Private Partnership (PPP), that is analyzed in Seoul by Bae and Joo (2016: 35-42) on various transport projects. One of the findings of their research

is that it needs new forms of PPP policy cooperation to derive efficient strategies in the future. Previous results do not seem very convincing to the authors.

The situation can be theoretically summarized as follows:

- Urban transformation processes are particularly future-oriented in Seoul and Singapore.
- Digitalization plays a dominant role in Seoul and Singapore.
- This development is almost unrestrained, as it takes place with the greatest possible exclusion of data protection concerns.
- The ideas and mission statements that should define future-oriented urban mobility strategies differ significantly in Seoul and Singapore.
- Digitalization projects in Seoul and Singapore are driving a change in the urban mobility concepts.
- In the Urban Governance, both Seoul and Singapore are barely or only very slowly opening themselves to new cooperative participation approaches that could offer the urban population effective co-determination opportunities.


Figure 2. Electronic Road Pricing (ERP): Singapore (Hekler M., 2016)

**Beyond the urban mobility policy in Seoul and Singapore**

Technologies and the Internet of Things (IoT) are strong in Singapore's *Smart Mobility 2030* strategic plan. The strategic plan, released at the end of 2014, shows how Singapore intends to implement its Intelligent Transport System (IST) over the next 15 years. The inclusion of static and dynamic data is a necessary prerequisite here. In model projects, among others, autonomous public transport vehicles under the real-world conditions and also the current system of road-user charges (see Figure 2) should be updated on a satellite basis (LTA and ITSS 2014).

In the city-state of Singapore, space is limited. On an area of only 719 square kilometers, about 12% of the area is currently used for roads and transport infrastructure. In addition to the population growth, with about 5.5 million inhabitants (2016), the density is also increasing with 7,697 inhabitants per square kilometer (2016) (Center for Liveable Cities and The Seoul Institute

2016). Singapore is implementing forward-looking, spatially networked and comprehensive transport projects at a rapid pace and aspires to be a role model for mostly Asian cities.

The city government presented the Strategic Plan Seoul *Transport Vision 2030* in 2013. A part of the Seoul *Transport Vision 2030* appears to be the realization of an Intelligent Transport System (ITS)where people are not an exclusive dependent on their cars. Another focus is the networking of technologies, infrastructures, mobility services and mobility offers for maximum transport efficiency. In addition to intelligent transport management, sustainable mobility solutions should also be expanded (Seoul Metropolitan Government 2013). In addition, the green transportation promotion zone is a policy measure from the Ministry of Land, Infrastructure and Transport (MOLIT) to introduce an eco-friendly transportation.

The South Korean capital Seoul has a land area of 605 square kilometers. 14% of the area is currently being used (2016) for roads and transport infrastructure. Seoul has approximately 5.5 million in-habitants (2016) and has a relatively high density of 17,018 inhabitants per square kilometer (2016) (Center for Livable Cities and The Seoul Institute 2016).

## Conclusion

Not everything that seems technologically feasible in principle is imperative or desirable for the urban future. In Seoul and Singapore, the urban and transport concepts are developing with considerable radicalism, which, if successful, can turn into trendsetters with considerable future relevance on a global scale.

**References**


1. An, J.; Kim J. (2015): 2030 Seoul Plan: Urban Foresight Focusing on Reflexive Governance and Resilience. In: *Proceedings of the 8th Conference of the International Forum on Urbanism* (IFoU): 354-369.
2. Bae, Y.; Joo, Y. M. (2016): Pathways to meet critical success factors for local PPPs: The cases of urban transport infrastructure in Korean cities. *In: Cities* 53: 35-42.
3. Bibri, S. E. (2018): The IoT for smart sustainable cities of the future: An analytical framework for sensor-based big data applications for environmental sustainability. In: *Sustainable Cities and Society* 38: 230-253.
4. Centre for Liveable Cities Singapore; The Seoul Institute (2016): *Walkable and Bikeable Cities: Lessons from Seoul and Singapore.*
5. Chowdhury, P. K. R.; Sutherland, S. H.; Ernst, K. M.; Pawlowski, A.; Schmidt, E. H.; Caspersen, J. R.; Zhao, Z.; Bhaduri, B. L. (2017): Big data in emerging cities. In: *Big Data for Regional Science*: 277-291. Abingdon, New York.
6. Kim, J. (2015): Towards Urban Mobility Transitions in Seoul: A Socio-Technical System Case Study and Policy Options for a Breakthrough of Cycling as a Commuting Mode. In: *8th Conference of the International Forum on Urbanism (*IFoU): 886-897.
7. Kitchin, R. (2014): The real-time city? Big data and smart urbanism. In*: GeoJournal* 79: 1-14.
8. Land Transport Authority (LTA); Intelligent Transport Society Singapore (ITSS) (2014): Smart Mobility 2030. ITS *Strategic Plan for Singapore*.
9. Rabari, C.; Storper M. (2014): The digital skin of cities: urban theory and research in the age of the sensored and metered city, ubiquitous computing and big data. In: *Cambridge Journal of Regions, Economy and Society* 8 (1): 27-42.
10. Seoul Metropolitan Government (SMG) (2013): *Seoul Transport Vision* 2030.
11. Shin, H.; Lee, K. (2017): Participatory governance and trans-sectoral mobilities: The new dynamics of adaptive preferences in the case of transport planning in Seoul, South Korea. In: *Cities* 65: 87-93.
12. Weber, M. K. (2006): Foresight and adaptive planning as complementary elements in anticipatory policymaking: A conceptual and methodological approach. In: *Reflexive Governance for Sustainable*
13. *Development,* Voß, J.-P.; Bauknecht, D.; Kemp, R., Eds. Edward Elgar: 189-221.
14. Wolfram, M. (2016): Conceptualizing urban transformative capacity: A framework for research and policy. In: *Cities* 51: 121-130.
15. Wolfram, M. (2017): Grassroots niches in urban contexts: exploring governance innovations for sustainable development in Seoul. In: *Procedia Engineering* 198: 622-641.
16. Zahraei, S. M.; Choo, C.; Cheema, W.; Cheah, L. (2016): Foresight Study on Singapore Urban Mobility: Methodologies and Preliminary Insights. In: *Complex Systems Design & Management Asia*: 135-145.