

# Innovative actions to build transformative capacity for urban transition in European and Chinese cities

Paper presented at the IST 2020 -11<sup>th</sup> International Sustainability Conference 2020, held on 18-21 August 2020 in Vienna.

**Authors:** Hans-Martin Neumann\*, Bernhard Müller\*\*, Susanne Meyer\*, Gudrun Haindlmaier\*, Daiva Jakutyte-Walangitang\*, Christoph Brodник\*, Jianming Cai\*\*\*, Yan Han\*\*\*

\* AIT Austrian Institute of Technology, Austria

\*\* TU Dresden, Germany

\*\*\* Chinese Academy of Sciences, China

**Corresponding author:** Hans-Martin Neumann (hans-martin.neumann@ait.ac.at)

**Key words:** smart cities; urban transition, transformative capacity, China, Europe, urban planning

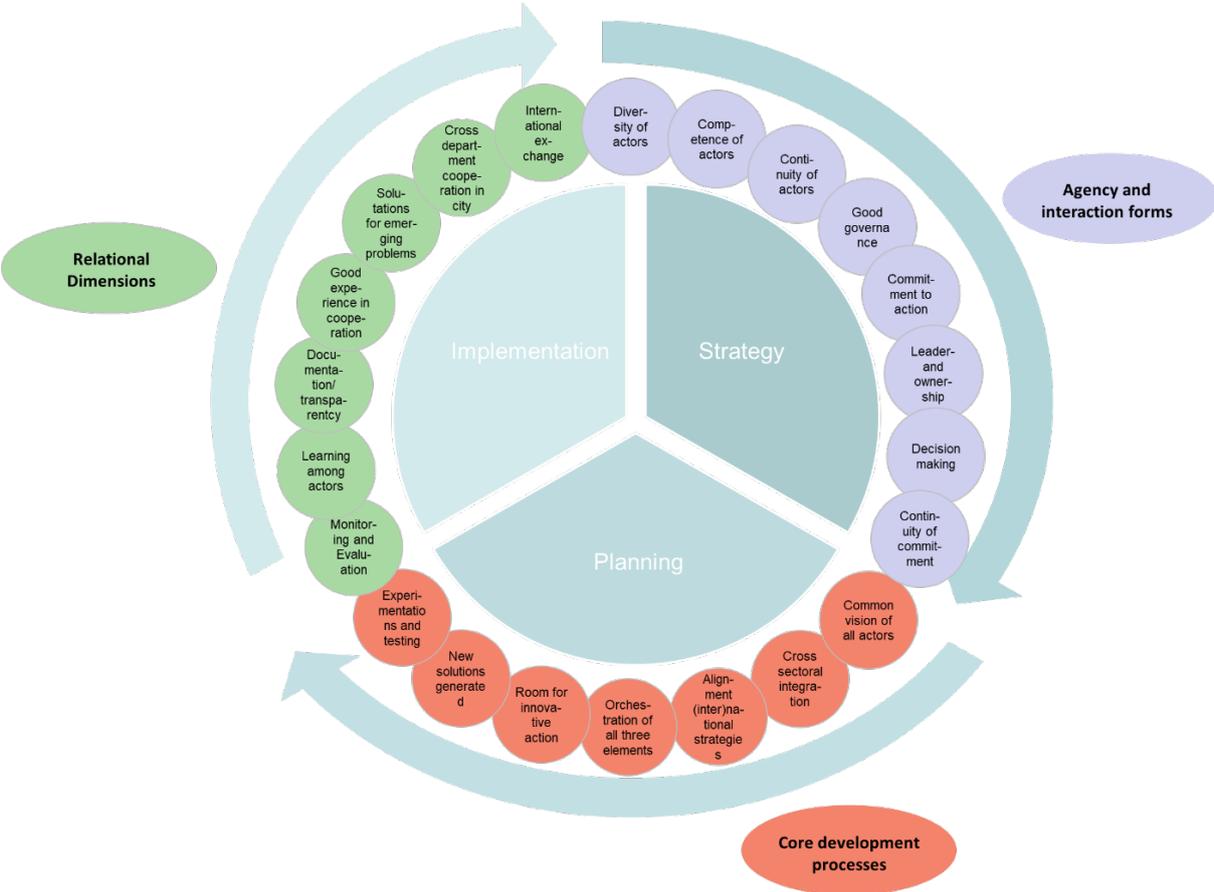
## 1 Background

Building environmentally friendly, livable, socially integrative, green, healthy and energy efficient cities is high on the European Agenda, and it has also become one of the top priorities of the Chinese government's commitment to foster further urbanization and to improve its environmental conditions. Inclusion, poverty, housing, air quality, climate adaptation, energy transition, sustainable use of land and nature-based solutions as well as digital transition are among the 12 priority themes of the Urban Agenda for the EU (Pact of Amsterdam) agreed at the Informal Meeting of EU Ministers Responsible for Urban Matters in 2016. And in the European Green Deal, it is stated that the "urban dimension of cohesion policy will be strengthened", and that further initiatives "will provide assistance to cities to help them make best use of opportunities to develop sustainable urban development strategies" (European Commission 2019, 23). In China, with the National New-type Urbanization Plan (2014-2020) the government has promoted a new strategy towards a "people-centered" urbanization. It pays attention to related pressing challenges, such as sustainable urban development, the integration of rural migrant workers into urban societies, combatting regionally unbalanced urbanization trends, the future of "ghost cities" which had emerged due to land development exceeding population growth in cities, and the improvement of urban management to fight "urban diseases" like traffic congestion as well as air, water and soil pollution, the protection of natural environments, and the provision of adequate services and infrastructure, including the provision of energy.

On this background, this research explores transformation processes towards urban sustainability in Europe and China. Its objective is to provide knowledge about and compare recent activities in Europe and China which promote urban sustainability transformations, especially regarding eco- and smart cities. It looks at the involvement of stakeholders as well as their approaches and capabilities to tread new paths towards urban sustainability and to develop socially integrative, economically viable as environmentally friendly and smart neighborhoods in cities. Several cases from Europe and China are presented. The research is conducted within the wider framework of the Horizon 2020 project TRANS-URBAN-EU-CHINA ([www.transurbaneuchine.eu](http://www.transurbaneuchine.eu)). With its research, the project aims to support the transition towards sustainability through socially integrative cities in Europe and China. The project consortium consists of 14 renowned partner institutions from Europe and China, and it has a duration of three years from 2018 until 2020. The Austrian Institute of Technology (AIT) and the Chinese Academy of Sciences (CAS) are work package leaders and co-leaders. Technische Universität Dresden (TUD) coordinates the project.

**2 Approach and methodology**

Following theoretical considerations of Wolfram (2016) an analytical framework to assess the transformative capacities of cities has been derived. This urban transformative capacity is considered – to a certain extent – as a prerequisite for long-term transformative change. Thereby, transformative capacity can be defined as the “collective ability to conceive, prepare for, initiate and perform path-deviant urban change, thus enabling future development within planetary boundaries” (cf. Wolfram 2016). The term “transformative capacity” originates from sustainability science, more specifically from the transition management discourse. In this scientific context, “transition” refers to discussions and practical applications with the aim of promoting fundamental and lasting changes in urban societies on the way to sustainable development. Loorbach et al. (2016) refer the term “transition” to “locked-in regimes that are challenged by changing contexts, ecological stress and societal pressure for change as well as experiments and innovations in niches driven by entrepreneurial networks, and creative communities and proactive administrators” (Loorbach et al. 2016). Transformative change from unsustainable to sustainable development paths can be seen as multi-actor processes, which entail interactions between social groups (Geels 2010).



**Figure 1.** Analytical framework to assess transformative capacities in smart cities (Meyer et al 2020)

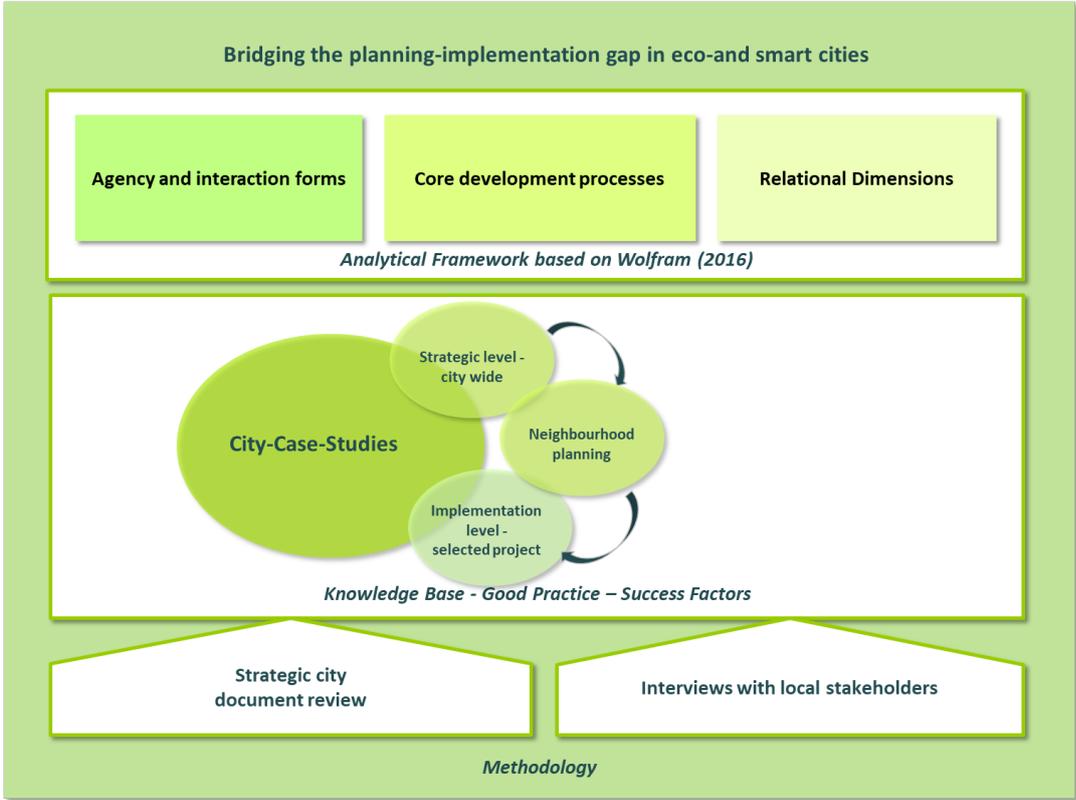
The integrated framework suggested by Wolfram (2016) maps out 10 interdependent key components, grouped into 3 clusters and refers transformative capacity to urban stakeholders, places, and processes both as a capacity source and subject of transformation. We have operationalized the framework to framework to measure transformative capacities for change in strategic planning, neighbourhood planning and implementation. For this, we assumed that the

key aspects identified by Wolfram (2016) are relevant along the entire policy cycle for integrative planning spanning from (1) urban strategic planning, (2) neighbourhood planning, (3) implementation (Figure 1). In order to generate empirical evidence for their relevance, as a final step the key aspects have been transferred into relevant questions for each phase along the policy cycle (Meyer et al. 2020).

This analytical framework has been empirically tested and eight city case studies in Europe and China. A range of methodologies was selected and applied to gather empirical information on the transformative capacities the selected cities, such as interviews with key stakeholders, strategic document analysis as well as applying heuristics and analysis of R&I data bases (Figure 2).

The case study approach includes the identification and sampling of cities for case studies in China and Europe and the implementation of the case studies. For this selection, successfully funded smart innovation and implementation projects in China and Europe have been analysed (sample criteria for the case study cities included: the active involvement of cities in the project generation, the number of projects cities are involved and the variety of programmes they are active, the planning history of the city, as well as population size), resulting in 8 selected cities both in Europe and China (16 in total) by considering both heterogeneity of sampling criteria and meanwhile comparability in terms of Smart City development.

The city case studies themselves included the development of a guiding questions related to each key aspect of the analytical framework to be followed during the empirical data collection for each city case study, desktop research on strategic and planning documents and potential implementation areas, interviews with selected stakeholders from the strategy, planning and implementation phase and analysis of empirical data and development of a city case study according to a template oriented towards the analysis framework.



**Figure 2.** Case Study Approach (Meyer et al 2020)

### **3 Case study results**

The following sections highlights exemplary capacity building measures from European and Chinese case studies

#### **3.1 Results from the European case studies**

Capacity building measures in the domain “Agency and Interaction Forms” will be described based on case insights from London (United Kingdom). The domain “Core Development Processes” will be exemplified by measures discovered in Stockholm (Sweden). Lastly, capacity building measures for the domain of “Relational Dimension” will be drawn from two Spanish cases, Santander and Madrid.

In terms of transformative capacities London exemplifies several strong measures for the domain “Agency and Interaction Forms”. Most notably these revolve around Leadership and ownership in the smart city development which are very well defined. The Smart City team of the Greater London Authority (GLA) sees itself as the advocate of the citizen in the digital transition process. This includes ensuring that citizens have effective means of recourse to safeguard their rights against technology providers in case a technology fails or is used in an irregular way. Moreover, Building project-based partnerships with a diversity of actors such as the boroughs, the top five local universities, the private sector and organisations of the so-called “mayoral family” (e.g. Transport for London, Police, Fire Brigade and the Cyber Security Agency) are an important vehicle for the implementation of the “Smarter London Together” Roadmap.

With regards to transformative capacity building in the domain “Core Development Processes” Stockholm is a noteworthy example. Stockholm managed to successfully translate strategic objectives into different city planning documents. For example, the Stockholm City Plan shows many connections to the various city strategies and takes their diverse objectives into account. Additionally, civil contracts have been used at an innovative urban development project: The Royal Seaport Stockholm. At this development site, the city owns the land and sets the requirements for developers through civil contracts. The requirements for these land allocation contracts are strict and specify a range of environmental, social and economic targets that become elaborated and translated into development requirements in thematic working groups that consist of experts from different city administration units and private sector companies. The use of such fora creates a space and process for working across city departments and sectors in an interactive way. As such, breaking down targets into binding requirements is used as an opportunity and designed as a process that brings otherwise separate groups together.

In terms of building transformative capacity in the “Relational Dimension” Santander and Madrid show some noteworthy approaches. A crucial factor had been intensive efforts to build trust between city actors and citizens in Madrid. Previously urban development efforts were stifled by a non-participatory culture. Likewise, Madrid also developed the “Relational Domain” by trying to create an “ownerships” of multiple small-scale implementation measures by various stakeholders. In the case of Santander the involvement of various actors in a continuous manner had been a crucial factor for this capacity domain. Here, the city has been in touch with many internal stakeholders (for example, individuals, service providers, operators, or entrepreneurships) as well as external stakeholders (such as World Bank etc.). Furthermore, the city offered dedicated training for the municipality staff which proved very helpful in to build transformative leadership amongst its employees.

#### **3.2 Results from the Chinese case studies**

Three primary measures for transformative capacity building can be identified and summarized from the Chinese case studies, mainly related to “Agency and interaction form”. Beijing and Tianjin are excellent examples for the practice of engaging a diversity of actors and appropriate resources, in

Shenzhen good practice on leadership and ownership by appropriate key actors can be discovered and different the cases of Dalian, Chongqing and Wuhan the continuity of actors across multi-level governments is well reflected.

In the domain of “Engagement of a diversity of actors and appropriate resources”, Tianjin is a representative city that has taken a series of innovative measures to promote multi-agent participation and resource integration. As a traditional base of heavy chemical industry city, Tianjin plays an important experimental role as a pilot city in exploring pathways towards a green and low-carbon urban development. Based on its preferential advantages in policy resources, Tianjin utilizes various market-oriented and financially innovative approaches in pursuing energy conservation and emission reduction, such as to explore and establish the carbon cap-and-trade system in the local context. Projects/programs were treated as anchors in constructing resource integration platform to enhance the national/international cooperation networks. The Sino-Singapore Tianjin Eco-City Program set a good example in this regard, in which three levels of agencies in the cooperative governance framework can be identified: i) strategic level, where a Joint coordinating council at the deputy Prime Minister administration was formed, responsible for key strategic matters in the cooperation; ii) policy level, where a working committee jointly led by Housing and Rural-urban Development Committee of China and the Ministry of Development of Singapore, for coordinating specific research activities and problem-solving mechanism; iii) implementation level, several thematic working groups established jointly composed of experts from two sides, respectively focusing on planning, economy, environment, ecology, community, transportation and so on.

Another effect of this program was the foundation of Eco-city Green Industry Alliance (EGIA), the first non-governmental voluntary organization in the field of emission reduction in China. EGIA is composed of national as well as overseas companies, institutes and individuals who all have high passion on environmental protection and public welfare, willing to strictly implement relevant environmental protection policies with self-commitment to reduce greenhouse gas emissions. As the national capital and aspiring for a best showcase in China, Beijing set up another good example in transformative capacity building by enhancing a bottom-up mechanism with the application of new IT technology into the urban planning practice. CITYIF, a cloud-based digital platform developed by Beijing Planning and Design Institute, can provide a powerful tool improving the participatory planning process through: i) data visualization and technical processing by using big data; ii) online/offline public display and dissemination; and iii) customized service for different user groups such as government, planners, companies and residents. CITYIF has also been applied in public projects, including the annual Beijing International Design Week, Dashilar Cross-Border Center. With help of CITYIF, planning practice in Beijing is gradually transforming from a “policy document on the shelf” into a social event involved urban residents and even school children. By participating in the design process of specific sites under the supervision of planners, young generations’ perception and awareness of public participation in urban planning has being greatly motivated.

In the domain of “leadership and ownership by appropriate key actors “, the case of Shenzhen does bring novel insights about how to optimize the process of planning implementation through separation of leadership and ownership. In Shenzhen, policy makers believe that the universally and traditionally adopted Engineering Procurement Construction method (EPC, a mechanism that defines contractor to be responsible for the whole process of design and implementation) in information infrastructure construction cannot meet the requirements of Smart City construction in megacities. A more comprehensive new organizational approach needs to be developed, in which the User Complex and +Supplier Complex should be well matched and integrated. User Complex mainly refers to the Economy, Trade and Information Commission of Shenzhen Municipality, plus other leading departments of relevant industries, responsible for making plans, regulations and supervision, as well

as general coordination of fields, regions, agencies and projects. Supplier Complex mainly refers to a general contractor to be responsible for orchestration of all projects and various sub-contractor of relevant industries to concretely carry out projects. The new approach makes the technological process of smart city construction be more specialized, standardized and scalable.

With regard to the domain “Continuity of actors cross multi-level governance/bodies”, cities such as Chongqing, Wuhan and Dalian exemplifies effective measures in the construction of Smart City. In China, the delivery process from strategies to implementation is closely related to the relationship/interactions between responsible agencies/bodies, is mainly shaped by governance structures, policies and business network. In this context, task decomposition is a common and efficient approach for main bodies at each level to receive tasks from upper level and accurately pass them to the lower one. This approach runs through all the delivery process from strategies to project, greatly guaranteeing the alignments as well as reducing transaction costs between multi-level bodies. At the strategic level, Dalian have identified several key areas and established a project library in its planning document of Smart City In the implementation process, projects of each area will grounded to the relevant industry sector as well as administrative department. At the administrative level, Top-Level Design method could be typically reflected in the case of Chongqing. The municipal government issued policy documents on the Sponge City construction of Yuelai New City at the very beginning of this project, aiming at giving a clear statement on involved units/departments (responsible departments, coordinating departments and supportive departments) of plan-making, technical application, technical standards, policies and institutions. At implementation level, Wuhan Optical valley is a notable example. The strategy of “Smart City 2+1+N” mention in its master plan elaborate on several key areas. Accordingly, in the Smart City Implementation Plan of Wuhan Optical Valley Central City, each area is further decomposed into a number of specific projects with clearly defined main bodies.

#### **4 Conclusions and outlook**

The results from the case studies show that our analytical framework is a powerful method for measuring the capacity for urban transformation in European and Chinese cities, as it helped us to clearly identify innovative actions applied by the cities to build transformative capacities and to foster urban transformation. Furthermore, it allows for a comparison of results from the different cities, leading to new insights:

- Across all case studies some transformative capacities measures are critical, for example: “Engagement of a diversity of actors and appropriate resources”, “leadership and ownership by appropriate key actors”, and “Continuity of actors cross multi-level governance/bodies”. The case analysis shows that these were present across all cases, there is a difference in the way these capacities are expressed between Chinese and European cities and that it is always embodies the local context.
- European cities show a stronger tendency to organise and substantiate this diversity of actors in more horizontal way, while Chinese cities express this diversity from a more vertically organised governance perspective.
- A similar observation can be made with the capacity measure of leadership and ownership which was also found to be critical across all cases. In European cities, this capacity measure manifests itself in a more decentralised way in which leadership and ownership becomes a more distributed phenomenon in smart city planning and implementation. In Chinese cities however, leadership and ownership are expressed in a more centralised and consolidated way.

These are first and thus preliminary findings. An extensive journal article on the results of the case studies is planned for the end of this year.

## **Literature**

European Commission (2016). Urban Agenda for the EU. The Pact of Amsterdam. Brussels: European Commission

European Commission (2019). The European Green Deal. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. Brussels: European Commission

Geels, F.W. (2010). Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective. *Research Policy* 39: 495-510

Government of the People's Republic of China (2014). National New-type Urbanization Plan (2014-2020). Beijing

Loorbach, D. et al. (Eds.) (2016). *Governance of Urban Sustainability Transitions. European and Asian Experiences.*

Loorbach, Derk, Wittmayer, Julia M., Shiroyama, Hideaki and Fujino, Junichi (Eds.). 2016. *Governance of Urban Sustainability Transitions. European and Asian Experiences.* Heidelberg: Springer-Verlag.

Meyer, S.; Brodnik, C.; Haindlmaier, G.; Neumann, H.-M.; Cai, J.; Han, Y. & Lin, J. (2020). Transformative capacity building in European and Chinese Cities to close the planning implementation gap. In B. Müller, B. Yang, L. Jian; P. Schiappaccasse & H-M Neumann (Eds). *Towards Socially Integrative Cities. Perspectives on Urban Sustainability in Europe and China.* Basel: MDPI (in review)

Wolfram, Marc and Niki Frantzeskaki. 2016. Cities and Systemic Change for Sustainability: Prevailing Epistemologies and an Emerging Research Agenda. *Sustainability* 8(2), 144.

## **Acknowledgment**

The research is conducted within the HORIZON 2020 project "TRANSURBAN EU-CHINA" under grant agreement No 770141. The project, which involves 14 partners from Europe and China, coordinated by TU Dresden, Germany, aims to support the transition towards urban sustainability through socially integrative cities in Europe and China.