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PATHWAYS OF SUSTAINABLE URBAN DEVELOPMENT ACROSS CHINA THE CASES OF HANGZHOU, DATONG AND ZHUHAI

Natacha Aveline-Dubach

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PATHWAYS OF SUSTAINABLE URBAN DEVELOPMENT ACROSS CHINA



THE CASES OF HANGZHOU, DATONG AND ZHUHAI

This e-book gives an overview of the research work carried out within the framework of the MEDIUM project. Entitled “New pathways for sustainable urban development in China’s medium-sized cities », the MEDIUM project was funded by the European Commission under EuropeAid program, and run for three years (09/2015—08/2018). Its main objective was to train European young researchers in the knowledge of urban China and to foster Sino-European scientific cooperation on urban development. Various means have been deployed to this end, including medium-term mobility schemes to conduct research in China, and by co-organizing a series of scientific events with Chinese universities.



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Contents

Introduction of the MEDIUM project	4
<i>Natacha Aveline-Dubach</i>	
Presentation of the three cities of the project	8
<i>Valentina Anzoise, Judith Audin and Yinghao Li</i>	
HANGZHOU AND THE ZHEJIANG PROVINCE	
Chapter 1	
Planning styles in evolution: insight from the case of Dream Town Internet village in Hangzhou, China	12
<i>Iraklis Argyriou and Nicolas Douay</i>	
Chapter 2	
Doing multi-sited fieldwork in China: Epistemic opportunities and Methodological challenges	27
<i>Valentina Anzoise</i>	
Chapter 3	
Spatial statistical analysis of GDP growth in Zhejiang province	38
<i>Veronica Distefano, Irene Poli, Debora Slanzi</i>	
DATONG	
Chapter 4	
Urban discrepancies in Datong (Shanxi): exploring the city in project and the city in concrete	50
<i>Judith Audin</i>	
ZHUHAI AND THE GUANGDONG PROVINCE	
Chapter 5	
Bridging smart to sustainability challenge of pursuing smart urban mobility in China	59
<i>Yinghao Li, Céline Bonhomme, José-Frédéric Deroubaix</i>	
Chapter 6	
"It spreads city to city": The implementation of Guangzhou Bus Rapid Transit	79
<i>Elise Ho-Pun-Cheung</i>	
Chapter 7	
Evolving accessibility landscapes: mutations of transportation networks in China	89
<i>Juste Raimbault</i>	
Chapter 8	
Building wealth through a stratified inclusion: the point-based hukou system in Zhuhai	109
<i>Cinzia Losavio</i>	
CROSS-CUTTING WORK ON PARTICIPATIVE APPROACHES IN THE THREE MEDIUM CITIES	
Chapter 9	
Experiments with participative approaches to sustainable urban planning in the three selected Chinese cities	123
<i>Erik Gløersen, Valentina Anzoise, Sabine Zillmer, Judith Audin, Yinghao Li</i>	
ANNEX	
Annex 1. The MEDIUM team	146
Annex 2. Beneficiaries of the mobility schemes to China, and related supervisors under the MEDIUM project	147

Introduction of the MEDIUM project

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Note 1

The definitions of city population are varied in China. We use here the overall population in 2018, which includes the rural population.

(http://www.hangzhou.gov.cn/art/2019/2/14/art_805865_30213801.html).

According to Elfie Swerts' urban population estimate, based on urban density and urbanization morphology, the figures are as follows for the cities studied: 3.6 million inhabitants for Hangzhou, 1.3 for Datong, and 0.6 for Zhuhai (<http://chinacitiesv1.parisgeo.cnrs.fr/>).

12 researchers from France, Greece, Italy and Spain benefited from the program, spending between four and twenty-four months at their host university

The MEDIUM project gathered a multidisciplinary, pan-European and Chinese research team around the little-explored issue of urbanization dynamics outside major urban centers in China. Our understanding of a “medium-sized city” was quite broad. We selected a second-tier regional metropolis of 9.8 million inhabitants¹ (Hangzhou), a third-tier inland mining city of 3.3 million inhabitants (Datong), and a prefecture-level city with a population of 1.7 million located in the Pearl River Delta (Zhuhai).

The consortium was led by the French National Research Center (CNRS, Research unit 8504 Géographie-cités), and included Ca' Foscari University in Venice, the IEP of Aix-en-Provence, the University of Lausanne and the private think tank Spatial Foresight for the European part, with Sun Yat-Sen University, Hangzhou Normal University and Shanxi Datong University as Chinese partners in the three cities selected for the project (see annex 1) . The teams brought together specialists from various disciplines (geographers, sociologists, political scientists, statisticians, engineers, etc.) around various issues related to sustainable urban development: social inclusion through housing, transport and urbanization, internationalization of firms and growth trajectories, environmental certification of firms, etc.

Fostering Sino-European scientific cooperation

Over the 36 months of the project, 12 researchers from France, Greece, Italy and Spain benefited from the program, spending between four and twenty-four months at their host university (See annex 2 for the list, biography is available on the following link: <https://mediumcities-china.org/#1528108708345-2b0a-4dbf-01f0>).

Among them, four doctoral students were able to finance fieldwork in China. About fifteen publications are in progress or in the pipeline, including articles in leading journals.

The MEDIUM mobility program enabled these researchers to acquire a knowledge of the Chinese language and culture, to establish numerous contacts in the academic and professional circles of their host city, and to participate in international conferences and scientific networks on urban China. MEDIUM has generated interest beyond the consortium partners, leading to the emergence of a small scientific community around the urbanization of medium-sized cities.

Six major scientific events were also organized in Chinese partner universities, including four workshops and three symposia. In 2018, MEDIUM



concluded its scientific activities with the organization of a symposium on innovation policies in China at the Hôtel de l'Industrie in Paris, in partnership with the Association pour la Valorisation des Relations Internationales Scientifiques et Techniques (Association for the Valuation of International Scientific and Technical Relations, AVRIST). This initiative brought together political, industrial and academic representatives from Europe and China to decipher Chinese innovation policies and drivers. The video of the conference is freely available on the link: <https://webcast.in2p3.fr/container/l-innovation-en-chine-decryptage-des-enjeux-urbains-socio-economiques-et-technologiques>. In addition, [two synthesis videos will be posted on You Tube](#).

Collaborative workshops for more inclusive planning

Beyond scientific cooperation, the project has developed a pilot experiment: training Chinese students (or university students) to lead stakeholder workshops applied to urban planning, with a view to organizing consultations involving users of a targeted urban area.

Stakeholder workshops are structured process workshops designed to identify sustainable development problems and explore possible solutions. They generally involve between 15 and 25 participants, alternating group discussions and plenary sessions. The objective

is to ensure that all can participate on an equal footing, and to promote the formulation of innovative proposals for more sustainable urban development.

For two or three days, these students actively discussed the city's strengths and weaknesses and reflected on how the city could develop more sustainable policies. Working on housing, travel, economic transitions and industrial conversion, they agreed on ambitious objectives and actions that would transform the city by 2022.

By alternating role-play and presentations by two professional facilitators, the trainees experienced a relatively common public consultation process in Europe. Then, a handful of volunteers took over from the facilitators and organized similar workshops with "real" local actors.

In 2018, at the initiative of two researchers from the Department of Environmental Sciences of Ca' Foscari University in Venice, the project also organized two workshops with representatives of the manufacturing industries of the cities of Guangzhou and Datong on international environmental standards and their applications for more environmentally friendly production processes.

In total, these workshops trained 49 students in stakeholder workshop facilitation techniques during training sessions organized in each of the partner universities. About 100 people participated in these initiatives.

The MEDIUM workshops trained 49 students in stakeholder workshop facilitation techniques during training sessions organized in each of the partner universities. About 100 people participated in these initiatives.

Figure 1
Presentation of the MEDIUM project to the Datong Municipal Government. (Source: Ruixiong Qi).

Figure 2
Visit of the Tashan Industrial Park in Datong. (Source: Florent Resche-Rigon).



Figure 3

Opening event of the MEDIUM conference in Hangzhou, West Lake area (June 26, 2016).

(Source: HZNU).

A multifaceted partnership

This Sino-European partnership was original in that it involved, as much as possible, the local authorities and economic actors of the Chinese cities in the project. Through conferences, training sessions, workshops or bilateral meetings, MEDIUM members have been able to establish fruitful exchanges with these key actors in urban development, allowing mutual learning on how to respond to the economic, social and environmental challenges of second-rate cities.

The intensity of the exchanges and human links that have been established at the end of the three years of the project are difficult to measure, yet this is an essential element. In China, perhaps more than elsewhere, access to data and contact with key research personnel remains very complicated; the trust links that have been established between Chinese and European partners and that will be maintained beyond the project will undoubtedly facilitate the clearing of new research fields.

These bonds of trust allowed for unexpected and sincere exchanges, particularly during the Consortium's three visits to Datong City, at the invitation of Shanxi University in Datong. The economic actors, the university and the municipality, not used to exchanges with foreign delegations, showed a strong interest in the expertise of the Consortium's members and were very cooperative.

Content of the e-book

This document brings together contributions of uneven levels of maturity in the publication process. Some are still very empirical, merely reflecting the fieldwork or the data analysis, others are based on articles already published. I am very grateful that most of the beneficiaries of the mobility schemes in China have accepted to share their results. Some authors who were not sent to China also joined the editorial project.

Acknowledgment

I would like to express my gratitude to the authors of this e-book, and to the Chinese colleagues who received them and provided them with important advice and support. My heartfelt thanks go to Professor Weiliang Zhang and Ms Zexia Liu from Hangzhou Normal University; Professor Shuzhen Chen, Doctor Ruixiong Qi and Mrs Rutian Li from Shanxi Datong University; Professor Desheng Xue, Professor Chunshan Zhou, Professor Suhong Zhou, Ms Chenyi Shi and Mr Ming Li from Sun Yat Sen University. I also would like to thank warmly our project manager Florent Resche-Rigon who has effectively overcome all the difficulties of a multi-country and multi-agency project.

This document brings together contributions of uneven levels of maturity in the publication process. Some are still very empirical, merely reflecting the fieldwork or the data analysis, others are based on articles already published.



The MEDIUM project has benefitted from the support of the European Union under the External actions of the EU - Grant Contract ICI+/2014/348-005. It was co-funded by the French National Research Center, Ca' Foscari University Venice, the IEP of Aix in Provence, Sun Yat-Sen University, Hangzhou Normal University and Shanxi Datong University.

Natacha Aveline-Dubach
MEDIUM project lead

MEDIUM network at the conference at Sun Yat Sen University (June 2017, on the left), Hangzhou Normal University (June 2016, on the right) and Shaanxi Datong University (May 2018, on the bottom).



Presentation of the three cities of the project

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Note 1

According to a Chinese proverb which praise the beauty of Suzhou and Hangzhou (i.e. “上有天堂,下有蘇杭” which means “There is heaven above and there is Suzhou and Hangzhou below”).

The MEDIUM project focused on three cities that are often overlooked in comparison with the major cities and also on three cities different in terms of size, background, reputation, etc. However, these cities show a common attempt to experiment new urban development pathways.

The first case study area of the MEDIUM project is Hangzhou, capital of Zhejiang province and southern centre of the Yangtze River Delta. It is a city with a long history, famous for its scenic beauties, like the West Lake, temples, pagodas, gardens, as well as causeways and artificial islands. Named as “a paradise in earth”¹, tourism has long been one of its main competitive assets but the city has also a strong tradition of entrepreneurship. It is also known for being innovative in urban planning (e.g. Hangzhou was the first city in China to introduce a bike-sharing system). The city has been seeking to assert itself in other fields, especially in relation to neighbouring with Shanghai. In the late 1990s, concrete plans and bolder reforms have been formulated to make the city more competitive, creative and liveable (Wei 2012). These trends were amplified by the intensity of urbanisation processes and by the creation of high-tech zones and scientific parks in suburban areas. Moreover, non-state-owned industries have changed the local economy and some of the most successful business tycoons in China - such as Alibaba - manage their activities from Hangzhou (Qian 2015). These economic transformation processes have been accompanied by city-level public policies that supported innovation and industries with low environmental impacts, while discouraging high-polluting labour-intensive industries with low technological content.

These plans generated a series of major positive outcomes. For instance, nowadays, after many efforts done to brand the city as “The City of Quality Life”, Hangzhou is broadly considered one of the most liveable cities in China. It has received several national and international awards, recognizing its high-quality environment (Delman 2014) and the city’s masterplans have transformed its identity and urban form. As a matter of facts, the different rounds of administrative rescaling have accelerated its expansion and spatial restructuring and a dispersed and multi-nuclei city has emerged: through annexations of the counties located on its urban fringe (i.e. Yuhang, Xiaoshan and Fuyang), Hangzhou has expanded its land area from 683 to 4,876 square kilometres and substantially increased its total constructed land and population, which currently counts around 9.8 million inhabitants. These trends were amplified by the intensity of urbanisation processes and by the creation of high-tech zones and scientific parks in suburban areas. Moreover, non-state-owned indu-



stries have changed the local economy and, in line the traditional entrepreneurial culture of the city, some of the most successful business tycoons in China manage their activities from Hangzhou (Qian 2015). These economic transformation processes have been accompanied by city-level public policies that supported innovation and industries with low environmental impacts, while discouraging high-polluting labour-intensive industries with low technological content. Nonetheless, the attractiveness and wealth of Hangzhou has also made it one of the most expensive Chinese cities to live in; the high cost living and increasing air pollution currently challenges the liveability of the city and Hangzhou's brand itself (Delman 2014).

The second case study considered is Datong, a third-tier city located in northern Shanxi province – a rural and industrial province with a GDP still below the national average. With a population of 3.3 million inhabitants, Datong is the second most important city in the province. Its economic development revolved around heavy industry (coal industry and thermic industry). Datong has a double identity: On the one hand, it is a historical city with a rich heritage such as the Yungang Grottoes listed as UNESCO World Heritage site; on the other hand, it is China's "coal capital" (*mei du* 煤都) suffocating under toxic smokes and air and water pollution. The social, human, and environmental cost of the coal industry was considered as a serious burden. Following Shanxi province regulations, the city government initiated a radical transformation aiming at reducing air pollution and developing the service sector while developing a new district supporting non-coal technologies and industries². It constitutes a valuable case study to understand the shifting governance from industrial to post-industrial city.

The third case study area is Zhuhai, located to the south-west bank the Pearl River Delta (PRD) region, and one of the fastest growing regions in China since the launch of the economic-reform and open-door policy in the late 1970s. Bordering with Macao, Zhuhai only became a city in 1979. In 1980, it was decided to establish one of the first four Special Economic Zones (SEZs) in China within its borders. However, it has adopted a different model compared to the other SEZs and to many cities in the PRD region whose strategy has been to focus on industrialization as the engine of economic growth. Zhuhai, in fact, has chosen to suppress polluting manufacturing companies and has introduced environmental protection regulations in order to maintain a high-quality natural landscape. The city government's efforts have been oriented to making Zhuhai become a coastal garden city for tourism development (especially in the earliest stage of economic reform in China, between 1979–1984).

As a result of these efforts, Zhuhai was recognized by the United Nations as the Best Model of International Residential Environment Improvement in 1998. It is broadly labelled as a major liveable garden city³ and income from tourism greatly contributes to the city GDP. However, Zhuhai ranks 10th (out of 11 cities) in terms of GDP in the PRD region⁴, which admittedly is one of

Note 2

See for instance: « 山西：省属煤企要带头减产量、去产能 » (Shanxi: provincial-level state-owned companies must be exemplary in the reduction of coal production and overcapacity), Shanxi Xinwen Wang, 7 May 2018, <https://www.cctd.com.cn/show-176-180787-1.html> (accessed on 5 June 2018).

Note 3

<https://www.macaomagazine.net/social-affairs/zhuhai-garden-city>
<https://www.worldfuturecouncil.org/wp-content/uploads/2018/03/English-Version-China-Review.pdf>”.

Note 4

Source: Municipal Bureau of Statistics and Fung Business Intelligence. For further information, see also “The Greater Bay Area Initiative - A survey on key drivers for success” (2017) kpmg.com/cn.



the economically best performing regions in China. In order to boost its economic development performance, Zhuhai is trying to develop into a high-tech city with better pollution control technologies. For this purpose, the city has adopted several policies to increase its total population (now 1.7 million inhabitants) as well as attract and cultivate science and technology talents since the 1990s (Sheng & Tang 2013). In the national urban development strategy adopted by the Chinese Government, the “small” and “green” Zhuhai is designated as the centre of the western bank of the Pearl River estuary. Local and regional stakeholders expect that the Hong Kong–Zhuhai–Macao Bridge will have a great impact on Zhuhai future development. However, whether Zhuhai can stick to its model of sustainable development in this new context is an open question. In this regard, for instance, questions are raised by the increasing need of land for urban construction that makes Zhuhai and the whole PRD one of the areas with the highest rate of land reclaimed from the sea.

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F I R S T C A S E

A landscape photograph showing a park area with a pond in the foreground. The pond reflects the sky and the construction cranes in the background. In the middle ground, there are various green plants and trees. In the background, several large construction cranes are visible against a hazy sky, with some buildings under construction. The overall scene suggests a blend of nature and urban development.

RESEARCH ON HANGZHOU AND ZHEJIANG PROVINCE

Chapter 1. Planning styles in evolution: insight from the case of Dream Town Internet village in Hangzhou, China

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Abstract

This chapter aims to map the types of planning styles applicable for innovation-driven urbanisation in the Chinese context, and to develop broader research implications for the study of urban planning and innovation. To this end, it presents a case study of the so-called ‘Dream Town’ Internet village for startups in the City of Hangzhou by drawing from interviews with urban actors. The discussion focuses on four main planning styles central for contemporary urbanisation in China - rational, strategic, green and collaborative - by identifying their relevance to the case of Dream Town. The findings suggest a strong influence of strategic planning aspects on the basis of a quasi-urban growth actor coalition regime, a moderate role of rational planning as a mean to regulate spatio-economic organisation at the urban level, and minimal incorporation of collaborative and green planning considerations. Based on the presented Chinese innovation case, a future research agenda is suggested centered on addressing more explicitly the role of Internet as an object of urban planning, and gaining a nuanced view of the variegated modes of governance through which the various planning styles effected for innovation-driven urbanisation are manifested in practice.

Keywords: Planning; Innovation economy; Internet startups; Hangzhou.

1. Introduction

Since the introduction of the Chinese reform period in the late 1970s, the country’s urbanisation has accelerated contributing largely to social and economic progress. With the domestic urban population projected to reach over 1 billion by 2030, Chinese cities are expected to play an increasingly important role for the country’s future trajectory (The World Bank and Development Research Center of the PRC State Council 2014). In fact, urbanisation is a high political priority of the central government as manifested in the 13th Five-Year Plan for Economic and Social Development (2016-2020) which lays the country’s urban-related strategic intentions and major objectives (Part XIII: New Urbanisation) (PRC Central Committee of Communist Party 2016). This plan



emphasizes the critical role of innovation for China's developmental prospects (Part II: Innovation-Driven Development). In addition, a (national) Five-Year Plan on technological innovation, approved in 2016, stresses the importance of innovation activities, including in the Internet sector, for promoting growth at the nationwide level (PRC State Council 2016). As a matter of fact, Chinese cities of various jurisdictional status (e.g. provincial; prefecture) and geographical location enact innovation policies whose future potential appears significant (Fang et al. 2014). Overall thus close connections between urbanisation, innovation and growth can be discerned in Chinese policy plans defined at the central and local level.

The pursuit of innovation-driven urbanisation in the Chinese context highlights clearly the evolving rationales and practices of city governance since the reform period. A particular area where such a shifting context can be manifested is urban planning which overall has evolved over time from a technical rationale (e.g. allocating state development projects to the city) to a strategic and market-oriented exercise with the goal of consolidating place-based competitiveness (Wu 2007). Aiming at mapping the evolving context for Chinese urban planning, this chapter presents a recent project of the Internet economy - the so-called 'Dream Town' Internet village - launched in April 2015 in the City of Hangzhou, the capital of Zhejiang province located at southeast China (Fig. 1).

Accordingly, the objectives of the research are twofold: to map the types of planning styles effected in the context of innovation-driven Chinese urbanisation (Hudson, Galloway, and Kaufman 1979; Innes and Gruber 2005) by looking at an exemplary project of the Internet economy; and to draw wider research implications for the study of urban planning and innovation based on the examined Chinese case. The choice of Dream Town as a case study is guided by two aspects. First, China is home to numerous activities for ICT-driven urban development, while the country witnesses a rapid development of its Internet sector with online users reaching over 720 million (China Daily 2015). Second, Dream Town is a contemporary state-led project aiming at stimulating growth in Hangzhou, as well as serving as a role model for innovation-driven urbanisation at the national level. As such, it offers a fruitful context in order to address the two research objectives. Fig. 2 presents an aerial view of the Dream Town Internet village.

The chapter proceeds as follows. Section 2 presents the context, methodology and data sources for the Dream Town case. Section 3 highlights four planning styles central for contemporary Chinese urbanisation and maps their relevance to Dream Town. Section 4 presents main research findings and conclusions.

Figure 1

Geographical location of the City of Hangzhou, home to Dream Town.

(Source: Wikipedia 2018 - Image by Uwe Dederer - Own work, CC BY-SA 3.0).

Figure 2

The main entrance area of the Dream Town Internet village, with the administrative building on the left.

(Source: authors).



2. Research context, methodology and data

Home to nearly 10 million people, including high-tech savvy users, and known for its vibrant entrepreneurial environment Hangzhou has been targeted by various policy plans in the last twenty years aiming at enacting a knowledge-driven economy (e.g. high-tech industrial zones; technology parks) (Qian 2015). A notable such recent project is the Zhejiang Hangzhou Future Sci-Tech City (FSTC), a scientific and technological innovation zone which was initiated in 2010 in the western part of Hangzhou, over a master planned area of 123 sq. km, as part of a national pilot scheme. The goal of the FSTC is to drive scientific and technological-based development at the city-regional level, and serve as role model of innovation-driven urbanisation at the national level. To this end, FSTC's approach is based on the triptych of 'talented individuals, innovative industries and resource development' to drive improvements in the scientific and technological innovation abilities of Hangzhou and Zhejiang province as a way of building a leading area where progress is achieved through the information economy (Hangzhou FSTC 2015a; ZOTP 2016). The FSTC project accommodates companies in what is called by its managing authorities 'strategic industries' including energy, new materials, health, finance and IT. The FSTC develops in a fast pace as a science and technology-driven growth pole at the city to regional level. It hosts among others large Chinese corporations like Alibaba and China Telecom but also smaller companies including startups. Operationally the FSTC relies on three delivery platforms one of which is Dream Town: a designated space for the promotion of Internet-related startups. Table 1 summarizes main actors, and the functions they take on, for the Dream Town project in the context of the FSTC.

Table 1
Main actors and their functions for Dream Town.

ACTORS	ORGANISATIONAL TYPE	FUNCTION
Government – central, provincial, municipal, district level	Departments and agencies	Political visioning; planning & policymaking; allocation of critical resources
FSTC management committee	Quasi-public agency	In charge of management (e.g. Deputy Director is chief of Dream Town)
Dream Town administration office	Quasi-public agency	Administrative remit (office is part of FSTC organisational structure)
Dream Town management company	Private entity	Outsourced responsibilities for day-to-day site operation
Startups	Private early-stage companies	Innovation objects aiming to grow and penetrate the market
Incubators	Private entities	Startup mentors, financiers and evaluators; connectors to external environment
Alibaba Trade Group	FSTC-headquartered Internet corporation	Role model; human resource pool; technical services; marketing platform
Domestic venture capital (VC) industry	Private entities	Financers and evaluators of startups



In order then to address the two research objectives through the Dream Town case (mapping planning styles and developing research implications for innovation-driven urbanisation) two hypotheses are tested (1): Internet is a factor of change for urban policies and actors and this is manifested as an articulation between four planning styles central to contemporary Chinese urbanisation; that is *rational planning*, *strategic planning*, *green planning* and *collaborative planning* (Douay 2008; Argyriou 2016; Douay and Qi 2018; Wu 2015); and (2) the *strategic planning* style exerts dominant influence in the design of the innovation-driven urbanisation. To test the two hypotheses a brief overview of the four planning styles in the Chinese context is offered which is then followed by a mapping of the existence or lack thereof of relevant planning characteristics in the case of Dream Town. In order to gain more detailed insight for the Dream Town case the discussion draws from twenty-six semi-structured interviews with the Hangzhou municipal planning bureau, FSTC agencies (Management Committee; Planning & Construction Committee; Investment Company) as well as Dream Town startups and incubators. All interviews but one (FSTC Management Committee) were conducted with senior personnel and lasted 30 to 45 minutes. Some interviews were in English and others in Chinese, while all were transcribed into English.

3. The four planning styles

3.1. Rational planning

3.1.1. A global paradigm and China's contemporary approach

In response to modernisation needs and influenced by a global trend in urban planning practice China adopted in the socialist period (c.1950s) a top-down rational urban planning approach as a way of materialising central economic policy goals largely through the localisation of state projects. With the advent of the country's new political regime and the opening to the world system in 1979, however, urban planning in China underwent significant changes in response to evolving politico-economic settings; most notably the country's transition to a market-oriented economy (Friedmann 2015) and the decentralisation of decision-making to city authorities under an 'urban entrepreneurialism' ethos (Douay 2008). Such conditions marked an attempt to steer city development on the basis of statutory provisions (e.g. 1990 City Planning Act), but also non-statutory plans (e.g. National Urban System Plan 2005-2020 led by the Ministry of Housing and Urban-Rural Development; 2010 Main Functional Area Plan under the remit of the National Development and Reform Commission) put in place within a hierarchical planning system (Fan et al. 2012). Such non-statutory plans represent a rational planning approach aiming at regulating urbanisation in response to accumulated problems resulting from prevailing modes of urban development (e.g. uncoordinated development; environmental deterioration) (Wu 2015).



3.1.2. The case of FSTC and Dream Town: Innovation-led urbanisation

The FSTC was initiated by the Central Organization Department and the State-Owned Assets Supervision and Administration Commission of the Chinese State Council in the context of a national pilot scheme (Douay and Henriot 2016; Henriot 2018) involving the cities of Hangzhou, Beijing, Tianjin and Wuhan (Management Committee of Chengxi Scientific Zone 2015). While the FSTC is part of a national pilot, strong policy demand originated at the sub-national level. For example, municipal and provincial political leadership perceived such a project important for the economic prospects of the whole Hangzhou municipality and Zhejiang province. Subsequently, the FSTC was jointly promoted at the provincial and municipal government level. At the same time, policy structures (e.g. Planning Committee) developed in the late 2000s at the sub-urban level to improve the spatial and economic planning of the Yuhang district in Hangzhou were used as a basis for the formulation of the FSTC Management Committee. The FSTC project thus incorporates elements of a top-down rational planning approach. It aims to address political goals and materialise formal plans (e.g. national economic policy on innovation; sub-national master plans) at different governmental levels (central; provincial; municipal; district) within a hierarchical planning system for urbanisation. For instance, the FSTC aspires to serve as a national role model for urbanisation while it also forms a core part of the Hangzhou Chengxi Science and Technology Innovation Zone - the industrial cluster in the Zhejiang province most focused on 'science and innovation' based development (Deloitte Shanghai 2015). It also aims to accelerate citywide economic transformation as well as comprehensive sub-urban development - hence it's been officially granted a 'city sub-centre' administrative status. From such a position, the FSTC is also compatible with the emerging premise of 'scientific development' advocated by contemporary Chinese political leadership (e.g. new generation leaders) which is largely predicated upon a technocratic perspective for urban affairs (Argyriou 2016).

3.2. Strategic planning

3.2.1. The strategic dimension of Chinese urban development

With the dominance of the neo-liberal paradigm in policymaking since the 1980s the strategic perspective has been adopted as the prevailing urban planning style worldwide (Mintzberg 2013). Diverging from rational planning, the strategic planning emphasizes 'public action on the search for results through the adoption of precise actions' (Douay 2008, p. 18) guided by the quest for efficiency in the pursuit of discrete projects. The strategic influence on urban planning in China is traced to the origins of the new regime which began considering cities as key territories for boosting national economic development (Wu 2007; Zhang 2007). This would take place in the context of the country's transition to a global-oriented market economy, the devolution of administrative and fiscal responsibilities to sub-national authorities, and a



state-controlled marketisation of production means aiming at turning land into a commodity that serves as a long-term revenue stream for local governments and their developmental plans (e.g. through the granting of land-use rights) (Qian 2011). Under such circumstances, Chinese cities, in particular the largest ones of the coastal zone, pursued location-oriented spatial and economic reorganisation as a way of structuring and expediting urban development (Douay 2008; He and Wu 2009). Within the triptych of 'globalisation-decentralization-marketisation' then strategic planning emerged as a core instrument for fuelling a state-led and market-oriented model of intense urban development on the basis of a growth actor coalition regime: that is, local authorities, as administrative urban service providers, and market-related agents interact with powerful private actors (e.g. real estate companies; land-based agents) in urban development processes often at the expense of other social groups (e.g. civil society) (Qian 2011).

Indeed, the intimate connection between strategic planning and a growth coalition regime for urban development can be observed in the evolving character of key aspects of the Chinese planning system (Wu 2007; Wu and Zhang 2007) such as aims, functionality, methods of plan-making, input/output and main actors. In general such aspects have diverted from serving a top-down bureaucratic approach for materialising central economic planning goals (e.g. based on blueprint plans and rigid procedures) to a policy-oriented approach towards formulating plans for place-based competitiveness and growth (Abramson 2006; Wu 2015). Such plans and goals are formulated by political elites and their business partners, often in collaboration with external experts (e.g. international consultants and planning firms). A typical example of strategic urban planning in the Chinese context is the designation by the state of special zones (e.g. economic; technological; scientific) within city jurisdictions (Wu 2015).

3.2.2. Dream Town: enacting strategic urbanisation through the Internet economy

The Dream Town site in Hangzhou supports Internet-related startups to innovate and grow. Interviewed startups commonly reported that Dream Town is an attractive area for settling-in due to the various supportive policies and resources available, and the engaging and entrepreneurial atmosphere of the Internet village. There are two ways for startups to enter Dream Town. The first is to pass the admission competition organised every month. The selection committee consists of an independent panel of experts from the academic, financial and industrial sectors. The second is through informal interactions with incubators located on-site which evaluate proposed project plans and decide whether they would like to support them. The support offered to startups is multi-faceted. For example, annual financial assistance of \$3000 is offered to be used in exchange of services (e.g. legal; financial planning; marketing) provided by the Dream Town management company. Further assistance



involves the granting of free office space for up to three years, and subsidies for on-site accommodation rent and utility costs. Moreover, seasonal competitions are organised by the Dream Town administration office where business proposals may receive up to \$30,000. Startups are also eligible for low-cost lending (e.g. discounted loans) of over \$150,000 through the Venture Loan Risk Pool mechanism setup by FSTC (Hangzhou FSTC 2015b). What is more, incubators provide financial and business-related support (e.g. business planning; connection with other startups and external entities; seed finance). Also, many events take place on-site where startups exchange ideas, share lessons and explore collaborative opportunities. Fig. 3 presents a view inside the Dream Town.

Figure 3

A view inside the Dream Town: Incubator buildings along a water canal.
(Source: authors).

On the top of preferential policies, various interactions centered on the startup innovation process take place on-site regularly. Specifically, startups interact between each other often in order to explore opportunities for expertise-matching. Startups also meet informally and discuss about their problems and potential solutions. Here the issue of employee recruitment stands out as particularly important largely because the Internet sector is a fast changing business area. Securing thus 'intelligent' human resources can increase chances of success. In certain cases, startups use each other for product promotion (e.g. online advertising; word of mouth). Furthermore, startups reported that the incubation environment facilitates fruitful peer interactions. However, some startups mentioned that due to limited resources (e.g. employees; time; finance) and a pressing timeframe (typically three to six months after admission) for making a leap forward in the business plan they tend to focus on in-house tasks rather than interacting with peers or other entities.

Startups also interact closely with hosting incubators. The latter in essence serve as 'umbrella entities' that provide diverse assistance. Specifically, incubators offer office space typically in their own building in order to facilitate interactions. Other than being the first point of contact for routine issue, incubators provide tailored support for business planning and connect startups to peers, other on-site incubators and external entities (e.g. regarding human resource, investment and product promotion issues). A particular area where incubators put emphasis in their role as mentors is finance. Other than connecting startups to potential investors (typically domestic VCs) which stop by Dream Town regularly to check out opportunities for collaboration, incubators may themselves invest in startups by offering capital in exchange of shareholding. In this regard, incubators can either invest directly (e.g. own funds) or bring in capital through their wider organisational structure. Also, incubators evaluate the performance of startups, a task which is also undertaken by any external investor involved in startup financing; these two types of entities may decide to continue or abandon supporting a startup whereas the FSTC do not hold any authority for directing startups to withdraw from Dream Town.



In addition, an external entity which plays central role for startups is Alibaba Trade Group, a company founded in 1999 by Jack Ma, a former college student of Hangzhou Normal University. Headquartered in Hangzhou, Alibaba grew within fifteen years to become one of the largest online worldwide retailers but also a multi-national company of diversified business lines. Headquartered within FSTC in the so-called 'Taobao City' covering over a 400,000m² area with capacity to accommodate over 15,000 employees, the company's role is multi-faceted. First, drawing from its success to transform into a global giant Alibaba serves as a role-model for startups. Alibaba also offers technical resources on-site which are available for free (e.g. cloud computing) while its online platform serves as a channel for the promotion and selling of Dream Town startup products. However, Alibaba's largest influence relates to capacity building. As a world renowned company in e-commerce it is considered an outstanding environment for the development of well-rounded employees in various segments of the Internet sector. In fact, many of the surveyed startups mentioned that the majority of their employees were once working or interning for Alibaba, thus bringing in valuable knowledge and expertise. Startup personnel also tend to interact informally with Alibaba employees for sharing experiences or seeking advice. But Alibaba is a source of expertise for incubators too; for example, three of the four co-founders of an incubator were once working in Alibaba's technical, product management and sales departments. Moreover, Alibaba exerts an influence as attractor of VCs in the FSTC, increasing in principle opportunities for VC investment in Dream Town startups.

In the above context of actor interactions, startups aim to reach the standards of their role model (Alibaba) in terms of magnitude and economic success. At the same time, governmental authorities aspire that even if a single startup manages to become the new Alibaba such an outcome will accrue various benefits to the state like increases in state revenues (e.g. employment and corporate taxes), the stimulation of consumption-based urbanisation (e.g. Alibaba's workforce is itself a large consumption group) as well as increases in surrounding land values which would then be factored in the Chinese land-use driven system of urban development.

3.3. Green planning

3.3.1. An emerging policy priority in Chinese urbanisation

China is part of the global trend on green urban development (Douay 2008; Curien 2014). The beginning of the 1990s marked an explicit interest by the central government in steering cities towards greater sustainability as a way of fostering quality of life but also attaining wider policy goals revolving around economic competitiveness and the rise of a 'harmonious society' (Liu et al. 2014). Sustainable development has thus emerged as a priority topic in national policymaking, as evident in policy directions of the 12th Five-Year Plan (2011-2015) around issues of resource efficiency and environmental sustaina-



bility (Yu 2014). National policymaking promotes green urban development through two main mechanisms: the awarding of demonstration projects and best practices to incentivise cities to take action on sustainability - relevant examples are the various 'eco-pilot' programs (county, city and provincial level) administered by the Ministry of Environmental Protection, the circulation of green-oriented governmental documents and specifications (e.g. targets; policy standards) and the provision of financial support for sustainability projects (Yu 2014). In addition to central government efforts, municipalities take on own sustainability initiatives. For example, low-carbon development is pursued by city governments as a way of developing environmentally friendly industries, spurring new jobs and improving urban infrastructure. As a result of the governmental policy leadership and guidance, as well as locally-led policy initiatives which often involve cooperation with international partners, China is now home to numerous urban green projects and experimental activities (Liu et al. 2014). Preliminary indications suggest mixed outcomes with respect to promoting green practices and lifestyles or environmental sustainability in more general whereby some efforts are considered more comprehensive (e.g. Sino-Singapore Tianjin eco-city) (Curien 2017) than others (e.g. Dongtan - the country's first planned eco-city project) (Wu 2015). Thus questions are raised whether pursued green planning truly promotes environmental sustainability at the urban level, and if so in what ways.

3.3.2. Dream Town: a green label?

In principle Dream Town aims to serve as a new model for sustainable urban development that incorporates green principles and practices. For example, Dream Town's master plan portrays the site as a forward looking project that sets new and improved standards of urbanisation including a 'car-free' social space that encourages experimentation and integrated environmental urbanism - e.g. through mixed-use development or preservation of the site's water channels and farmland (Argyriou 2016). However, other than such broadly defined policy statements, there is virtually no evidence of Dream Town representing a green example either in terms of planning principles (e.g. besides general claims for preservation of existing amenities), wider urban activities (e.g. integrated green-oriented urban development) or startup products. Indeed, nearly all interviewed startups which were asked whether they work on, or plan to develop, green applications (e.g. energy efficient household systems) replied negatively. Overall, thus, Dream Town appears to primarily reflect policy rhetoric rather than on-the-ground (green) practice.

3.4. Collaborative planning

3.4.1. Preliminary efforts to address Chinese urban affairs through wider settings

There is consensus that the collaborative approach is now the dominant paradigm in western spatial planning practice. The Chinese experience



however shows the same limits that western practices have faced in collaborative planning endeavors (Alexander 1997). China has a top-down planning system where political power is hierarchically concentrated at formal governance authorities. In fact, contemporary spatial planning is largely dominated by pro-growth actors coalitions dominated by local state actors (Jiang, Waley and Gonzales 2016; Wu 2015). In order to develop the social acceptability of planning decisions, the collaborative influence helps responding to citizens' actions, be it of the NIMBY variety or more general demands for participation in the planning process. More recently public participation has received wider attention by governmental authorities. For example, citizens are often invited to provide suggestions for hometown planning through the Internet or government mailboxes. In addition, urban planning exhibition halls are open to the public and accept feedback from visitors. One good example is the city of Chengdu, the capital of Sichuan province, with the implementation of a participatory budget (Cabannes and Ming 2014). It funded nearly 40,000 projects decided by citizens between 2009 and 2012.

However, public participation to date is often limited to information provision and basic interactions without any form of real civic empowerment in decision-making processes. Nevertheless, the emergence of collaborative approaches to urban affairs has raised questions of social inequality and reinforced demand for political reforms. The development of Chinese metropolises is almost inevitably accompanied by the deepening of social inequalities. The question of social polarisation relates mainly to the millions of marginalised persons, the mingong (rural migrant workers). Moreover, the displacement of population in the name of real estate development projects has led to numerous expropriations which are often the source of major conflicts. In such conditions, the dynamics of socio-spatial polarisation could become explosive if ignored. In more general, the construction of a 'harmonious society', a term coined by the Chinese political leadership, supposes the development of new democratic mechanisms. In such a context it is possible to imagine that the political leadership will play the role of a mediator among disparate socio-economic interests (Lam 2007) but only the organisation of free elections or the emancipation of residents' committees would facilitate genuine citizen participation in planning mechanisms.

3.4.2. FSTC and Dream Town: thin participation of wider social interests

The Dream Town case offers little evidence of collaborative planning. This is largely reflected on the limited public participation in the FSTC planning process. Specifically, the policy directions and planning processes for the FSTC site were defined by governmental departments at various levels (from the central to the district level), relevant quasi-public agencies (e.g. FSTC Management Committee), external professional consultants and the powerful Alibaba corporation which is one of the few private companies that interacts directly with city government agencies on planning issues (e.g. regarding land allocation for the company's Taobao City facility within the FSTC). Furthermore,



FSTC planning-related documents and information are not always publicly available. At a more micro level, civil society input is limited too. For example, plans for the ongoing development of the FSTC territory are typically announced to citizens and civil groups after they have been finalised. For instance, this is the case as regards to road development but also interventions in the physical space that could potentially invoke controversy (e.g. location of waste management facility). As the FSTC Management Committee reported, the lack of public involvement is partly justified on rationales for safeguarding the efficiency of the planning process. In fact, the single formal mean for civic representation in the FSTC planning process is through input by National People's Representatives, one of the highest Chinese political authorities. Besides the planning process itself there are virtually no examples of Dream Town products or activities that incorporate a 'community dimension': in the few cases of interviewed startups active in social issues the reported activities were bounded to promotion of online communication forums (e.g. cultural activities or identification of community economic opportunities) yet without targeting broader social mobilisation around potential community issues.

4. Conclusions

This chapter explored the role of the planning system in innovation-driven urbanisation by looking at the case of a flagship state-led project of the digital urban economy - the Dream Town Internet village in Hangzhou, China. Accordingly, it conceptualised the role of the planning system for the Dream Town innovation site, in the context of a scientific and technological innovation zone at the sub-urban level (FSTC), as the articulation of four planning styles - rational, strategic, green and collaborative - in order to map their relative influence when designing the 'Chinese Silicon Valley'. The discussion revealed an overarching role for the rational planning style as a mean to regulate spatial and economic organisation at the urban level. At the same time little influence was found as regards to the green and collaborative planning styles, suggesting that the examined innovation project, in the context of the hosting technological zone, has not addressed broader participatory and environmental issues. The largest influence however was linked to strategic planning rationales revolving around the pursuit of territorial urban growth on the basis of place-based marketisation, economic competitiveness and business innovation. In this context, the Dream Town project was found predicated upon the workings of a quasi-urban growth coalition comprised of powerful multi-level state agencies and political leadership, an influential area-based corporation (Alibaba), quasi-public managing agencies (FSTC), the domestic VC industry, as well as on-site incubators and small-scale innovation entities (startups); the latter (startups and incubators) serving in essence as state arm-lengths for the realisation of policy goals on innovation-driven urbanisation. Accordingly, main aspects relevant to the four planning styles, as emerging from the Dream Town case, can be summarised as follows:



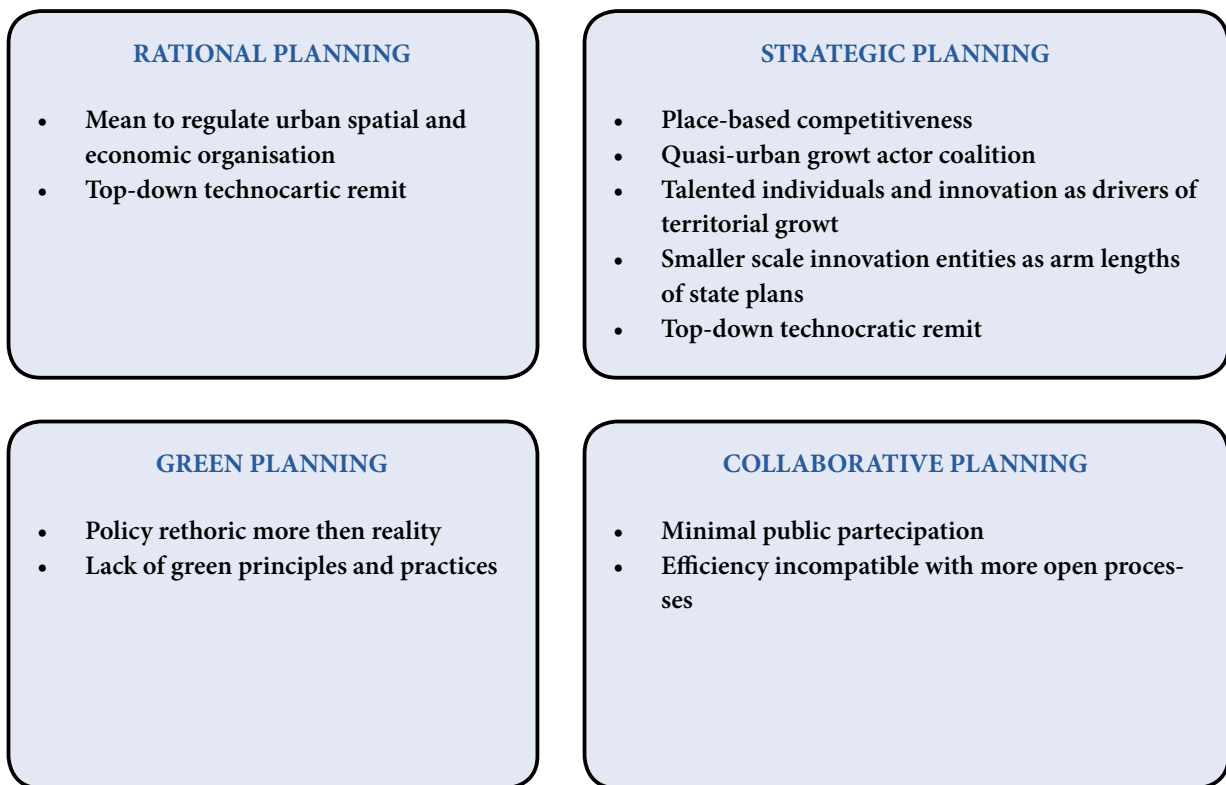


Figure 4

The main aspects relevant to the four planning styles.

Based on the presented case from Hangzhou, China, a future research outlook is proposed for the study of urban planning and innovation on the basis of three recommendations. The first involves analysing explicitly the role of Internet as an object of urban planning in an informatisation era. The second refers to the interplay of the various planning styles applicable in particular contexts for the design of innovation-driven urbanisation. The last recommendation entails gaining nuanced understanding of the variegated modes of governance through which different planning styles influence innovation-based urbanisation, and how relevant governing processes take place in practice.

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Chapter 2. Doing multi-sited fieldwork in China: Epistemic opportunities and Methodological challenges

Valentina Anzoise

Abstract

A crucial issue when conducting fieldwork is developing research design and strategies to deal with the complexity of the whole research path, so as to effectively contribute to enhance social understanding of phenomena not only by developing novel empirical techniques of inquiry but also by enhancing the debate on the kinds of knowledge we are producing and the worlds we occupy as well as make (Back & Puwar 2012).

Drawing on the research I conducted within the MEDIUM project, which focused on the perception of the landscape transformations experienced by two urban fringes in Hangzhou and Zhuhai where two high tech zones have been built, my aim is to critically reflect on the epistemic opportunities and methodological challenges of multi-sited field research within a Constructivist Grounded Theory framework (Charmaz 2014).

Keywords: Fieldwork, research design, urban landscape, high tech zones, perception.

1. Introduction

In line with the reflection proposed by Law and Urry, who argued that social scientific methods have resulted in an extremely limited range of attentions, as they poorly deal with the fleeting, the distributed, the multiple, the non-causal, the chaotic, the complex, the sensory, the emotional and the kinaesthetic (Law and Urry 2004, p. 403), during the field research I have been conducting within the MEDIUM project, I developed an evolutionary and collaborative research design to cope with the complexity and speed of the changes at play in urban China, especially on its urban fringes. For the same reason, I have tried to use multiple modalities for data collection - document analysis, qualitative interviews, photo-documentation, image-driven interviews, etc. - to embed into the research path forms of attentiveness that could

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expand the sensory dimensions and contribute to the design of methods that move with the social world and develop multiple vantage points from which empirical accounts are generated (Back 2012).

Thus, the choice of conducting a multi-sited fieldwork¹ (Marcus 1995; Hannerz 2003) and triangulating quali-quantitative methods was meant to both enrich the research with further insights, by enhancing its iterativity and reflexivity, and to let emerge the limitations and paradoxes inherent in any research design. Nonetheless, adopting such an approach raised new questions and showed other types of complexities, partially given to the different multiple registers used by myself and by the subjects involved in the processes I was observing.

In this chapter, I will briefly discuss the strategies developed, difficulties and constraints encountered and choices undertaken, in particular: 1. the choice of a multi-sited fieldwork for theoretical saturation and for the development of substantive theory, and 2. the exploratory use of mixed-methods for the construction of feedback loops to guide successive steps of analysis.

2. Multi-site fieldwork: a tale of two urban fringes

Within the MEDIUM project, I have conducted a two-years research about the perceptions of the transformations induced on landscape by the current patterns of urbanization in China. My fieldwork has focused on those areas – the high-tech zones – that, in China, greatly exemplify the speed of this process and the dramatic changes induced by it. These are, in fact, huge free zones created at the beginning of the 80s to assist modernization through technology transfer (Walcott 2002), gradually reduce regional disparities (Ruiming and Renjie 2016) and attract foreign investment mainly by means of favorable tax agreements and preferential policies. Since the 80s they have been disseminated all over the country and now they considerably contribute to China's GDP².

In the last decades these zones have also evolved: what once were just large industrial areas have become technopoles (Castells and Hall, 1994) which integrate many other urban functions (i.e. residential, commercial, administrative, educational, recreational...) and very often they turned into brand new cities or new independent administrative zones.

To investigate the processes at play in these complex spaces I developed the notion of “fringscape” as a conceptual and methodological “device” which both refer to the transitional feature of a funding element of the urban project (i.e. the urban fringe) that produce fringe-scaped and fringe-shaped environments whose transformations fuel new imaginaries about modernity (Bach, 2011) and where new populations and activities can settle and find resources while urban and rural activities are still juxtaposed. The use I make of the suffix -scape, as it has been previously done by Arjun Appadurai (1990) to decouple -scape from land, offers also a methodological indication: the interactions

Note 1

i.e. a mode of research that “... moves out from single sites and local situations of conventional ethnographic research designs to examine the circulation of cultural meanings, objects and identities in diffuse time space ... This mobile ethnography takes unexpected trajectories in tracing a cultural formation across and within multiple sites of activity” (Marcus, 1995: 96).

Note 2

11.7 % of China's GDP in 2016.



occurring in these areas are not “objectively given relations which look the same from every angle of vision, but rather they are highly perspectival constructs, inflected very much by the historical, linguistic and political situatedness of different sort of actors” (Appadurai 1990, p. 296). The need then, is to develop tools and methods to make most apparent the interactions between humans and natural environments as well as the political, socio-cultural, economic challenges of contemporary urban world, together with its functioning and contradictions.

Fieldwork is based on an idea of knowledge as situated in space and it cannot do anything else but proceed as a learning process that allows the researcher to cope with the insecurity of an open-ended process which might take an entirely different direction than imagined (Sæther 2006). One of the major source of insecurity when doing fieldwork in China – and which was the case also of the present research - is definitely related with the language barrier. Language do not inhibit learning but might complicate the process, make data collection, processing and analysis longer and sometimes highly frustrating. Even when the researcher is in contact with some academic insiders, as I was, they can act both as doorkeepers and gatekeepers as they often fear foreign researchers not having the necessary qualifications to deal with such a complex context (and language proficiency is one of this).

For this reason, during my long-period stay, while studying Chinese, I had also to develop diverse source of understanding as well as a flexible and iterative methodology that could grow more robust as learning occurred.

Any researcher knows that arriving in a new place means entering a new subject position, where the fieldworker’s identity is defined in relation to people who see this place as their home (Sæther 2006, p. 47). Arriving in a brand-new place was, in some respect, even more challenging: these new areas were in fact questioning also the identity and position of the subjects observed since, also in Chinese cities, new urban morphologies have been progressively arising (faster than any other country in the world) from the combination of different populations (Martinotti 1996) and from new patterns of social relations which are emerging in time and space. Interestingly enough, in a very contemporary type of urban morphologies like the high-tech zones, my status as a foreigner and a researcher, in some respects, could easily fit and also be useful to arrange contacts and interviews.

The MEDIUM project offered me the opportunity to conduct a long period of mobility in China in Hangzhou and Zhuhai, therefore in order to get a more comprehensive understanding of China’s urbanization, during my stay I went to several places to observe the planning and development of high tech zones but two of these areas, Zhejiang Hangzhou Future Sci-Tech City and Zhuhai high tech zone,³ formed the core of this study.

Note 3

For more background information about high tech zones development in China and for a description of the two areas analyzed see also the author other contribution (Presentation of the three cities of the project, p. 8).



3. (Visual) Grounded Theory and mixed methods

Figure 1

Zhuhai is a city well known for its good weather and sustainability policy and Tangiawan district (which coincides with the high tech zone area) is branding itself as a wellness-oriented area. (Source: author).

Note 4

Both terms, according to Rose (2012) refer to the ways in which both what is seen and how it is seen are culturally constructed.

Figure 2

The whole Pearl River Delta region is building modern sport infrastructures and greenways which are very appreciated by sport lovers. (Source: author).

One of the major reason for focusing on the perceptions of the populations that are experiencing – at different levels and with different implications – the development of these areas is that, so far, too little consideration has been given to these populations and to their (emerging) needs and concerns. Perceptions provide important keys to grasp what people imagine (stereotypes), what people see (cognition), and also to what extent what they assume to know, influences their knowledge. They also offer cues to understand how people develop attitudes as well as their patterns of representation and the structures of their behaviors and decisions and their analysis could be crucial in the construction of subjective indicators, for instance, of quality of life and wellbeing of urban environments.

From the outset, my research design was meant to be open-ended and exploratory in nature. Therefore, in order to investigate the *visuality* and *scopic regime*⁴ that contribute to shape the perceptions and knowledges people develop about so dramatic landscape transformations, I decided to adopt a Grounded Theory (GT) approach to keep theorizing to the ground. According to the research experience discussed here, which made extensive use of visual data – as it relied on the assumption that, especially in contemporary cities, perceptions, knowledges and interactions are increasingly articulated visually (Rose 2012, p. 4) – Grounded Theory can be used as a general method (Charmaz 2014) for both giving "voice" and (con)text to visual data and making visual processes emerge. On the one hand, we can have a GT with visual data to comprehend psychosocial processes (whenever the research question does not eminently entail a visual process) and, in this case, the collection of visual data is meant to strengthen the meaning of textual data and can be used for triangulation. On the other hand, a Visual GT tends to understand visual processes through visual data that relate to some visual dynamics (Anzoi & Ghirotto 2017) and, in this other case, the visual data should provide the primary or only source for the analysis (Konecki 2011). Nonetheless, Visual GT and GT with visual data reside in a continuum that goes from studying visual processes to inquiring phenomena that can be better elicited by visual data.

To investigate the perceptions and knowledges of different stakeholders populating the high-tech zones, I have conducted image-driven interviews using a composition of photos (Harper 2002). Images are, in fact, not only polysemic but they have their own agency, they are performative visual objects which, regardless of their content, can prompt talk in different register, evoke different kind of memories (not necessarily visual, as photos can convey also synaesthetic and kinaesthetic effects) and provoke different sensory responses. Therefore, the use I made of images was not simply meant to illustrate some aspects of the project but these were "actively used in the research process, alongside with other sort of evidence generated usually by interviews or ethno-



graphic fieldwork” (Rose 2012, p. 298). Indeed, the photos I used to conduct the interviews have been selected from the photo-documentation I realized during fieldwork and the interviewees were asked not only to comment but also to select some photos (and eventually suggest others they would have taken) and realize their own composition to represent the processes at play in the area, thus producing a peculiar kind of “respondent-generated imagery” (Pauwels 2010), as the following excerpts show.

I do not have much opinions and feelings, about these images. They are not special to me... Maybe just the ones about the sport activities [photos 24 and 25] (...)

But if I had to take some, I would take images about four aspects: the first is the air quality index four years ago and now, I would show this gap, no matter to friends and the Government. Although the air quality here ranks among the top in China, the air quality is indeed decreasing; and the second is the people and the culture here (...). The third is real estate: places around GREE Coast are crowded with houses, four years ago there was only GREE Coast. Although the building of the real estate has, to some extent, improved the surrounding environment, there are also a lot of negative parts, like the facts that now it is too crowded... and fourth, I would like to take a picture of the night-time, to see how many lights are on in these living districts, with this picture you could immediately show that the Government wants to attract more people to come here and contribute to the area's development but in fact it is the opposite: people are just buying houses for investment and now they are just empty there. I live in "Horizon Cove" residential compounds and I can see that many houses are empty and the weeds are growing in their yards. This makes me feel uncomfortable... (Zhuhai, new resident, F).

This photo has been taken before the development, and now there will be a subway here [photo 30]. People say they can take an after-dinner trip by subway to somewhere else after it is completed. They never expected such a good thing before (...) These houses [photo 5] are being rebuilt as what they looked like in the past: black bricks and white walls, very antique. (...). I think the photos you have taken are enough, basically, but maybe several places are missing. If you can take some more photos about Dream Town⁵ after it is completely finished, that would be enough. Because these photos tend to be old ones⁶, the new ones, after renovation, are needed. (...). Some of them are representative of the past, but are gone, you cannot see them anymore, for example like these [photo 1, photo 4], some are representative of now, and there will be more like this [photo 5] in the future. (Hangzhou, village council representative, M).

Figure 3 and 4
Setting of the image-driven interview.
(Source: author).

Note 5
Dream Town, also called the Internet Village, has been established in Cangqian (the main township in the Future Sci-Tech City area), to host start-up companies.

Note 6
This interview was conducted in June 2016. All the photos showed had been taken few months before (between October 2015 and May 2016) but given the speed of change some of them resulted already old.





Figure 5

A selection of the images used by the interviewee in the photo composition representing the changes and main processes at play in Hangzhou Future Sci-Tech City.

(Source: author).

This particular way of setting and conducting the interviews was meant to enhance participants' interpretative freedom, access their imaginaries and let emerge their visual and narrative logic. Through the elicitation of the relational and interactive cognition that research participants have of these places, it was possible to unveil personal values and unpack dominant narratives, as it is shown by the following excerpts, which both belong to two high tech workers which frame the high-tech zones discourse in a totally different way.

Here are two contradictions and two opportunities [Fig. 6]. The first one [photo 11] is a contradiction. The positioning of this district is for sure high-tech district but actually before this planning it was just a rural area, with many small towns distributed unevenly within it (...). These things coexist all together here, but the old rural areas do not correspond with the idea and image of the high-tech zone (...)

The reason why I chose this picture [photo 19] is because real estate in Zhuhai is just magic: before there was nothing here. The whole area is land reclaimed from the sea, like the place where I work. After they have reclaimed the land from the sea, actually there was a large, empty area, and many real estate companies have been flowing into it. But actually, I can't say if it is a good and sustainable development model. At the moment everything is not sure yet but whether it is a good thing or not I can't tell (Zhuhai, high tech worker, M).





Figure 6

A selection of the images used by the interviewee in the photo composition representing the changes and main processes at play in Zhuhai high tech zone. (Source: author).

Maybe in the near future this land here will disappear [photo 18]: no more land, no more farmers, they will live from the rent of their house because each of them will have four apartments⁷ (...). I don't think this is that good because the Government wants to do just one way: make them become modern. In their plans they want to make Hangzhou another Shanghai, a modern city, no farmlands left, but sometimes there should be... but this depends on their plans. Here there are also small buildings. We want to save the environment but sometimes we also have to maintain some of the original things (...). It would be very sad for me if everything will look the same. If you go to Shanghai or Beijing it is all high-rise buildings and it is not so nice. I think that our plans, our economic development should be more complex. We should have also farmers, not only companies [photo 7] (...). It should not be all like Haichuangyuan (the Scientific Park) or Alibaba, I think. There should be more ways, it should be more diverse, because we should also offer this people [photo 22] a way to live. Now we can buy the things that they sell on Taobao, so how they could live? I think these [photo 18] are farmlands to make a living and we still need farmers. I do not want these places to disappear, I think in the city we still need to have some land (Hangzhou, high tech worker, F).

Note 7

As a compensation for land expropriation.



Figure 7

A selection of the images used by the interviewee in the photo composition representing the changes and main processes at play in Hangzhou Future Sci-Tech City .

(Source: author).

The narrative and visual analysis of such a rich empirical base has been mainly conducted using Nvivo, to support GT iterativity and facilitate the qualitative analysis of textual and audiovisual data sources (Creswell 2007; Niedbalski and Slezak 2016; Bringer et al. 2016). Then the open coding conducted with Nvivo, which allowed the identification of focused nodes and conceptual categories, articulated in sub-categories, allowed also the extraction of short texts that have been then elaborated to estimate a statistical model for textual analysis and discover complex latent structures in the data (STM) (Roberts et al. 2014; Roberts et al. 2016; Anzoise et al. 2019).

The conduction of a mixed-method analysis was the result of an interdisciplinary dialogue – among a sociologist and two statisticians – and it contributed to enhance the overall reflexivity of the research process generating the in feedback loops that guided the successive steps of analysis. For instance, the topics identified using a textual analysis methodology such as STM – where the topics' estimations are derived from probabilistic distributions over a vocabulary of words and which are evaluated through a combination of semantic coherence and exclusivity of words – induced me to go back again to the coding done using Nvivo and to check and refine the conceptual categories and sub-categories I had identified.

Moreover, as already discussed two ways have been pursued for reaching saturation and a consistent theoretical model (Anzoise and Ghirotto 2017). The first one consisted in continuing the theoretical sampling adding another case study area. The second, in letting participants indicate, suggest (during the interview or soon after) the visual data they would have added/considered.

To conclude, I would also add that the overall research partially developed as a collaborative ethnography. Especially during the first year of fieldwork, a Chinese student (studying English literature and who then become a very good friend of mine) supported me in the conduction of the interviews and sometimes she also asked to join my field observations. We had long talks about my photo-documentation and this was a great opportunity of mutual learning and intercultural dialogue. For her, who was not even Hangzhou local, it was like discovering something she had never seen/thought about before and for me it was another way to know more about Chinese culture and challenge my own



preconceptions and taken for granted. She became so familiar and involved with my research that she contributed to the final selection of the photos and during the interviews sometimes she also asked questions herself. In Zhuhai, another student (studying Language Interpretation) joined me during the interviews but she was not so passionately involved in the overall research process. Nonetheless, in both contexts, the dialogue I established with my interpreters – that also became deeper and deeper as my knowledge of Chinese language improved – has greatly contributed to my understanding of China.

4. Concluding remarks

The research path I have outlined in this chapter was meant to critically discuss the heuristic power of images when used as some combination of evidence, representation and performative visual objects (Rose 2012), but also to address some practical circumstances that can influence the researcher's actual research design and practices. "Adaptations made in the field are often overlooked or downplayed when a project is written up as if the design was fixed from day one" (Heimer 2006: 59) and even fewer scholars discuss how they deal with the risk of a never-ending iterativity and reflexivity of the research process or with under-analyzed data or findings that would need further interpretation (and, sometimes, also further data collection). A comprehensive analysis of all the data collected — from official statistics, to fieldnotes, participants' spontaneous conversations or social networks posts, etc. — looks like a "mission impossible" especially when multi-sited fieldwork is conducted mainly alone, on an under-researched field and with time and funding limits.

To conclude, adopting a Constructivist Grounded Theory framework and using mixed-methods showed a potential to develop process-oriented methodologies that can both achieve a robust analysis and engage multiple publics, in multiple ways (Buroway 2005). Nonetheless, there is still a long way to go about developing design methods that can move at the same speed of the social world and reduce its complexity without giving away the richness and sensitivity of the data collected during fieldwork but that can develop a sound, comprehensive, and timely analysis that effectively and critically re-enter the circle of knowledge production.



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Chapter 3. Spatial statistical analysis of GDP growth in Zhejiang province

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Abstract

In recent years China has experienced a rapid and strong economic development with high rates of growth of the GDP. This development, sustained by great public investments, may have produced, or changed, some territorial inequalities, focusing more in some regions with respect to others. With the aim to evaluate this process and possible effects on the Chinese society we conducted a spatial statistical analysis on regional inequalities in Zhejiang province, one of the most developed provinces of China. This spatial analysis is based on per capita GDP, here proposed as principal indicator of regional economic development, and is conducted both at prefecture level and at county level division, in the period 2010-2016. The choice of this regional units is motivated by the limited contributions in the literature on this territorial level, since most of the studies have been conducted on the whole provinces or macro regions. The provincial inequality is firstly measured with Gini coefficient and then the intra-provincial inequality is measured with spatial statistical techniques, which include Moran I index, spatial autocorrelation, GIS map. This analysis shows that in the period considered the overall inequalities are decreased, with a remarkable spatial dependence relation at the county level.

Keywords: Spatial statistical; data analysis; per capita GDP; Gini coefficient; Moran I index.

1. Introduction

Since the beginning of the reform of 1978, China's economy has achieved a rapid development in all the regions through a process of decentralization and globalization. This rapid economic growth in the era of reform is associated with a spatially uneven development with profound changes especially between coastal and inland China, as described by (Li and Wei 2010; Xue and Zeng 2016; Xue et al. 2016). The main factors that have characterized the unequal rate of growth are the differences in the level of infrastructure development, proximity to markets and coastal areas, natural resource endowments, demographic factors and regional policy (Stiglitz 2012). These factors in fact seem to have determined the economic wealth mainly in some regions of China. This regional inequality has been one of the most salient features of develop-



ment in China, and it may threaten national unity and social stability. Moreover, the presence of economic inequality between regions might have been an obstacle to the sustainable growth, as discussed in (Alesina and Rodrik 1991; Persson and Tabellini 2011; Zhang 2016). Wei and Fan (2000) have argued that “Inequalities exist within provinces, and the spatial transformation in China cannot be thoroughly understood without the study of intra-provincial inequality” (Graham and Ernstson 2012). Hence, China’s government has been, and is committed to resolve this regional inequality based on different spatial scale-level (Yue et al. 2014; Wei et al. 2009; Chen et al. 2012), including at region-level (Lyhagen and Rickne 2013; Xu et al. 2005; Fan et al. 2011), at province-level (Zhang et al. 2016; Zhang 2012), and intra-provincial-level (Chen 2012).

However, although most studies have been focused on the evolution of regional in-equality among Chinese provinces and groups of provinces (Li et al. 2010; Li and Fang 2014; Wei et al. 2009; Fan and Sun 2008; Ye and Chen 2008) recently the research on the regional inequality in China has been extended to intra-provincial analysis of inequalities. Notably, this last aspect has been developed with the recent advancements in the GIS technology (Geographical Information System) and spatial statistical analysis (Berry et al. 1968), which have been provided to analyze spatial association, agglomeration and clustering (Bailey and Gatrell 1995).

Indeed, with the aid of GIS technology and spatial statistical methods, the patterns of regional inequality can be deeply explored at regional, municipal and county levels.

In this paper, GIS technology is integrated with spatial statistical methods for analyze regional inequality. In particular, applying this methodology we can investigate Zhejiang province inequality at the county level using a dataset that include Percapita GDP based on resident population.

We employed the 89 counties of Zhejiang province as spatial data in two different period 2010 and 2016. The source of data have been collected from “Statistical Year-book Zhejiang Province (2005, 2010 and 2016)”. In this work, we investigated the intra-provincial inequality in Zhejiang province to achieve a measure of inequality among the counties and evaluate the dynamics of this inequality in the period 2010-2016. With this aim, we adopted the Gini coefficient and the spatial autocorrelation indicators.

The results that we achieved show that per capita GDP inequality at county level in Zhejiang province is decreased according to Gini coefficient. This decreasing inequality is characterized by a local dependence relation of per capita GDP increase, for which high levels of county per capita GDP affect the neighbor counties as well as low levels of county per capita GDP affect the levels of the neighbor counties. This aspect of the inequality is confirmed by the spatial autocorrelation indicators. The paper is structured as follows: Section 2 presents a brief description of the study area of Zhejiang province; Section 3 describes the measures of intra-provincial inequality adopted such as Gini coefficient, for investigating the level of intra-provincial inequality, and Moran’s index and GIS technology for studing spatial autocorrelation (Anse-



lin 1995; Anselin 1996). Section 4 presents the results of our study showing the intra-provincial inequalities dynamics in the period 2010-2016.

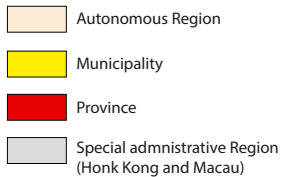
2. The Zhejiang province

According to the Constitution of the People's Republic of China, currently in China there are three levels of administration, described below (china.org.cn):

- the first level includes provinces, autonomous regions and municipalities directly under the Central Government;
- the second level includes provinces and autonomous regions which are divided into autonomous prefectures, counties, autonomous counties and cities;
- the third level includes counties and autonomous counties which are divided into townships, nationality townships and towns;
-

With reference to the first administrative level there are 34 divisions, classified as 23 provinces, 4 municipalities, 5 autonomous regions and 2 special administered regions. The four municipalities are: Beijing, Shanghai, Tianjin and Chongqing, while the special administrative regions are Hong Kong and Macau. We describe this administrative level in Fig. 1.

Figure 1
The administrative level in China.



In this study we focus on Zhejiang province. It is probably one of the provinces of China that has most benefited from the reform policies, and its economic and social growth reflects the economic trend of many other coastal provinces such as Jiangsu and Shandong. It covers approximately an area of 101.800 square kilometers, that is one of the smallest province of China (only 1.06% of total area of China). Moreover, the area of the province encompasses 70.4% territory in mountains and hills, 23.2% in plains and basins, and 6.4% in water surface. Zhejiang province is located on the east coast of China and it is bordered by Jiangsu Province and Shanghai municipality to the north, Anhui and Jiangxi Province to the west, and Fujian Province to the south. Hangzhou is the capital of Zhejiang Province, and Ningbo is directly under the jurisdiction of the national central government. In addition, more than 3061 islands (each with a land area of > 500 m²) are distributed in this coastal area.

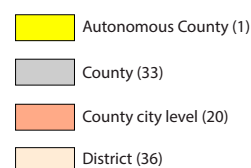
Zhejiang province in the year 2016 includes 11 cities at prefecture level and 89 county level (36 districts, 20 county-level cities, 33 counties). In particular, the 11 cities are classified in two sub-provincial cities, namely Hangzhou and Ningbo and nine prefecture-level cities, namely Wenzhou, Huzhou, Jiaxing, Shaoxing, Jinhua, Quzhou, Zhoushan, Taizhou and Lishui.

The administrative structure of Zhejiang province is presented in Fig. 2 where Fig. a) describes the prefecture administrative level while the Fig. 2 b) describes the county administration level.

Finally, the Zhejiang province is traditionally divided into northeast (Hangzhou, Ningbo, Jiaxing, Huzhou, Shaoxing, Zhoushan) and southwest (Wenzhou, Jinhua, Quzhou, Taizhou, Lishui)..

Figure 2

The administrative division of Zhejiang province: a) prefecture administration level (11 prefectures) and b) the county administration level (89 counties).



3. Inequality measures

To develop a study on economic inequality among counties in the Zhejiang province, we used the following inequality measures:

- Gini coefficient to evaluate the level and the dynamics of the inequality in the period 2010-2016;
- the Moran index, the spatial autocorrelation and GIS maps to study the local dependence among the counties, adopted spatial autocorrelation indicator.

3.1 Gini coefficient of inequality

As a measure of inequality we adopted Gini coefficient since it is a very well know and commonly used indicator for evaluating the wealth and income inequality (Sen 1997; Cowell 2000).

The Gini coefficient is defined as follows (Gini 1912):

$$G = \frac{\sum_{i=1}^n \sum_{j=1}^n |x_i - x_j|}{2n^2 \sum_{i=1}^n x_i}$$

where x_i and x_j in this analysis represents the value of per capita GDP in county i and county j , respectively, and n is the number of counties. This coefficient takevalues from 0 to 1, where 0 indicates perfect equality, namely the total income is distributed evenly between counties, and 1 indicates a perfect inequality situation whit only one county gets whole income. Gini coefficient can be viewed as a indicator that allows to measure how equity has changed in a given situation over time, in particular how per capita GDP changed among all the counties in Zhejiang province in the period considered.

3.2 Moran's index and spatial autocorrelation

The Global Moran's index is a measure of spatial clustering (Cliff and Ord 1981; Upton and Fingleton 1985) and it is used to detect global and local spatial dependence and autocorrelation among regions. In general, the index provides a formal indication of the degree of linear association between the spatial units and their neighbors. Considering Zhejiang Province divided in n counties Moran's I index takes in the following form::

$$I = \frac{\sum_{i=1}^n \sum_{j=1}^n w_{ij} (x_i - \bar{x})(x_j - \bar{x})}{\sum_i (x_i - \bar{x})^2}$$

where x_i and x_j represents in our study per capita GDP for counties i and j , \bar{x} is the mean of the value of the n counties; and w_{ij} is the spatial weight matrix element that measures the strength of the relationship between two spatial units. The spatial weights are used to measure the spatial contiguity or



neighborhood of a given county.

The values of the Moran's I range from -1 to $+1$. Positive values suggest the presence of spatial clustering of similar values (positive spatial autocorrelation) while negative values indicate spatial clustering of dissimilar values (negative spatial autocorrelation). A value equal to 0 means a random spatial pattern.

In literature several methods to define the spatial weights matrices have been proposed. These methods can be based on distance between neighbors or spatially contiguous neighbors.

In this work, the spatial weights matrix is based on territorial contiguity of the counties. Therefore, w_{ij} is a binary weight matrix, such that, $w_{ij} = 1$ if the i -th object is adjacent to the j -th object (share a boundary), $w_{ij} = 0$ otherwise. Usually, the spatial weights matrix is row-standardized such that the elements w_{ij} in each row sum to 1 .

3.3 Moran graph

The information that we can achieve from Moran's index can be described in a graph where it is reported the spatially lagged variable (Wy) on the y -axis and the original variable observed on the x -axis (Anselin 1995). The Moran graph gives an indication of the degree of linear association between the observed values and the spatially lag of the variable observed. In the Moran graph data are dispersed in four quadrants that provide an easy way to categorize the spatial autocorrelation. In particular, the positive autocorrelation involves a distribution of counties in the 1st and 3rd quadrants of the graph. While, the negative autocorrelation involves a distribution of counties in the 2nd and 4th quadrants of the graph. Therefore, plotting the counties of Zhejiang province by using the Moran graph we can evaluate how the economic growth of a county can affect the economic growth of contiguous county developing a contagious process.

4. The decreasing inequality and the local economic growth dependence

In order to measure the economic growth inequality in Zhejiang province through per capita GDP, we consider data from "Statistical Yearbook Zhejiang Province (2005, 2010 and 2016)" and select two geographical scales the prefecture and county level divisions. In this province the population increased from 48.98 (millions of people) of 2005 to 55.9 (millions of people) of 2016. Moreover, in this period the urban resident population is increased from 27.42 (millions of people) in 2005 to 37.45 (millions of people) in 2016, whereas its rural population is decreased from 21.52 (millions of people) to 18.45 (millions of people) in the same period. This rapid growth of urban areas is the main result of two factors: the natural increase in population and China's urbanization policies which requires a strict control of permanent migration to large cities [4]. In Fig. 3 we present the spatial distribution of per capita registered in

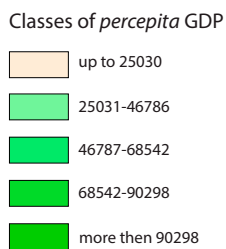


2005, 2010 and 2016, for the 11 prefectures (or municipalities as they are traditionally called) of Zhejiang province.

This representation shows that the value of per capita GDP is increased in all prefectures, in the period 2005-2016. According to this representation the five prefectures located in the north of Zhejiang province recorded a great growth: Hangzhou, Shaoxing and Ningbo achieved the higher per capita GDP in 2016, followed by Huzhou and Jiaxing with the second highest per capita GDP growth. The prefectures located in the south of Zhejiang province were instead poorest, but they experienced an increasing growth in this period. We evaluate the intra-provincial economic inequality by computing the Gini coefficient.

This indicator decreases from 0.29 in 2010 to 0.18 in 2016, indicating a reduction of the intra-provincial inequality, as described also in Fig. 3.

Figure 3
Thematic map of the per capita GDP for 2005, 2010 and 2016 in Zhejiang province.



To evaluate a possible contiguity dependence of the per capita GDP growth we derived the spatial autocorrelation and the Moran Index. On these data the Moran index value of 0.13 for 2010 and of 0.46 for 2016. These values are both positive expressing a GDP dependence relation between contiguous counties. The increasing values from 2010 to 2016 show also an expanding local dependence process, mostly due to economies of scales derived from the proximity of the counties. In fact, high (low) developed counties affect the growth rate of contiguous counties in the positive relation but also in the negative relation.

In Fig. 4 we notice that most counties fall in the 1st and 3rd quadrants indicating positive spatial autocorrelation. From 2010 to 2016 we also notice an increasing dispersion of the values involving a greater presence of counties with high and low values.

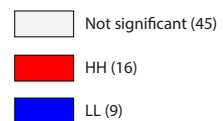
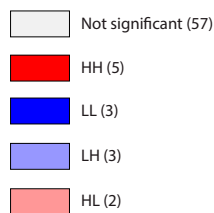


For instance in 2010, the counties as Xiaoshan, Xinchang and Shengzhou were collocated in the 2nd quadrant then in 2016, these counties changed their position in the graph and they moved to 1st quadrant. On the other hand, from 2010 to 2016 in the 3rd quadrant were collocated counties as Linshai, Ruian, Jingning and Taishun which present a lower economic growth.

In Fig. 5 we can see the GIS map that represents the geographic distribution corresponding to the Moran graph. The GIS map reveals that high income counties are clustered in the north while low GDP are clustered in the south, in both years considered.

Figure 4
Moran graph for per capita GDP, in the years 2010 and 2016.

Figure 5
GIS map corresponding in the years 2010 and 2016.



Observing the dynamics between 2010 and 2016 we notice that the cluster of counties with high GDP increases as well the cluster of counties with low GDP, confirming the contagious process for the rich counties (red) can help contiguous counties to increase their GDP; but poor counties can also affect their neighbor to become even poorer.

In particular, in the 2016 more than 17% of the 89 counties are spatial clusters in (in red in GIS map), focusing on Yangtse River Delta that includes Shaoxing, Jiaxing, Hangzhou, Ningbo, Huzhou. In particular, this spatial cluster located in the north of Zhejiang is economically developed and the counties are highly dynamic. The large companies and the high-tech zones are located in Hangzhou and Ningbo, whereas the textile production industry leading to the creation of a large enterprise center are located in Shaoxing and Jiaxing.

The cluster of low GDP counties (in blue in GIS map) is concentrated around Wenzhou and Taizhou prefectures. Several reasons can explain the gap, but in particular the financial crisis that started in Wenzhou in 2011 bankrupted several firms.

5. Conclusions

In this paper, we investigated the per capita GDP inequality in one of China's most developed provinces, the Zhejiang province. In particular, the analysis has been developed in two steps: we evaluated the inequality among counties in the Zhejiang province by using the Gini coefficient as measure of inequality. Its value gives an indication of the level and dynamics of this inequality in the considered period. We then evaluated a possible local dependence of GDP levels between one county and its neighbours. The results have shown a reduction in the time of the intra-provincial inequality, since the Gini coefficient decreases from 0.29 in 2010 to 0.18 in 2016. In addition, the values of the Moran's index and the spatial autocorrelation have shown a strong relationship of contiguity dependence, confirming the described contagious process where the rich counties affect neighboring counties to increase their GDP; whereas the poor counties affect contiguous counties to decrease their GDP. Therefore, this dynamic highlights the gap between north and south of Zhejiang province.



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S E C O N D C A S E



RESEARCH ON DATONG

Chapter 4. Urban discrepancies in Datong (Shanxi): exploring the city in project and the city in concrete

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Abstract

This chapter is based on an ethnographic fieldwork carried out between 2015 and 2018 in Datong, a city in northern Shanxi province, also nicknamed “China’s coal capital” 煤都, at a very critical time. In 2008, the city centre became the object of an ambitious plan of urban makeover around the theme of the “historical and cultural city”, put in motion between 2008 and 2013, which led to a large operation of demolition-reconstruction. The project was suddenly interrupted because of a difficult political transition. In Datong’s mining district, the state-owned company TM still manages the coal industry. But the company’s activity suddenly slowed down in the context of the coal crisis. Many places in the city reflect the trajectory of fast expansion, until an uncertain direction. This chapter analyses the liminal moment of Datong’s shifting identity by carrying out fieldwork in transitional spaces, highlighting “gaps” and “holes” between the city in project and the city in concrete. Focusing on the notion of “discrepancy” is a way to explain the dynamics of social and spatial change in post-socialist industrial resource-based cities. By studying interrupted and uncertain processes of displacement, demolition and (re)construction in Datong, shifting gravity centres and development policies, this ethnographic study goes deeper into the spatial, economic, and social processes of urban transformation in the context of post-industrial transformation, from industrial expansion to culture-based urban planning.

Keywords: Datong (Shanxi, China); resource-based city; culture-based urbanism; socio-spatial inequalities; post-industrial transformation; ethnography; temporalities.

1. Introduction

This chapter analyses the socio-spatial dimensions of “urban discrepancies” in Datong, a medium-sized city in Shanxi, as a way to analyse the on-going transformations from “resource-based city” (资源型城市) to culture-based urban planning. This third-tier coal-mining city has been facing the post-industrial turn since 2012. I study this process down to the ground, taking into



account both the materiality of the urban space and the ways of life of the inhabitants. By choosing an ethnographic approach on postindustrialism (Vaccaro et al. 2016), this chapter highlights processes of disconnection and thus brings out the overlooked aspects of construction booms in China.

Datong constitutes a particularly interesting case study. This third-tier city is located in northern Shanxi province, which has a rural-industrial image and a GDP still below the national average. With a population of 3.3 million inhabitants, it is the second most important city in the province. Its economic development revolved around heavy industry (coal industry and thermic industry). Datong indeed has a double identity: historical city with the Yungang Grottoes listed as UNESCO World Heritage site, and “coal capital” (*mei du*) suffocating under toxic smokes and air pollution.

In 2008, the city centre became the object of an ambitious plan of urban makeover around the theme of the “historical and cultural city”, put in motion between 2008 and 2013, which led to a large operation of demolition-reconstruction well described in the documentary film by Zhou Hao entitled “The Chinese Mayor”. The project was suddenly interrupted because of a difficult political transition when the mayor was transferred in Taiyuan at the beginning of 2013. In the half-demolished half-rebuilt city centre, long-term inhabitants still live in the rubble.

In Datong’s mining district, the state-owned company Tongmei Group (TM) progressively absorbed the majority of mining sites during the growth of the coal industry. In 2006, the miners, who used to live on the coal mine sites in precarious and uncomfortable self-built houses, were relocated in a new urban area, built and financed by TM. But the company’s activity suddenly slowed down in the context of the coal crisis. Many places in the city reflect the traces of this trajectory of expansion, and then decline. The mining area is now a protected land, which still carries remains of the mining town residential ruins, where the last miners still wait for relocation. In the city centre and in the mining district, the urban space reveals a state of waiting, without a clear deadline.

While research on construction booms in Chinese cities mainly focuses on the major cities, this ethnographic study aims to understand the dynamics of medium-sized cities, using Datong as a case study. The few academic publications about Datong focus on the remaking of the city centre, and on “the question of whether Datong exemplifies the processes of Disneyfication or self-referentiality” (Fu and Hillier, p. 167). Research on urban construction in China tends to analyse the dynamics from a macro or a meso perspective (Wu 2015), by studying urban governance, or the “ghost city” phenomenon (Li 2017). This study takes a different approach and underlines the issue of construction and urban reconversion from below, through an ethnographic perspective and from the local inhabitants and workers who interact daily with the urban space.



I spent eleven months in Datong and carried out long-term fieldwork both in the city centre and in several mining villages and in the relocation district in Datong mining district to document the frozen construction projects and the unfinished operations of shantytown renewal (*penghuqu gaizao*). The choice of an ethnographic method allows understanding this situation from below, closer to the ground, paying attention to the materiality of the socio-spatial fabric at the street and at the neighbourhood level.

In this perspective, the notion of “urban discrepancy” allow to focus on the rhythms of urban construction (Maccaglia 2014), what was planned, the city in project and the city in concrete. Discrepancies are understood as an “in-between” (Deboulet 2012) stage where the city shows its vestiges, its traces, its fragments, and its desires through construction and demolition sites.

This research reflects on these liminal spaces, these transitional and unfinished construction or demolition sites, in order to provide an ethnographic analysis on Datong’s reconversion in progress. The discrepancies of Datong will be analysed under two dimensions – culture-based urban planning and post-industrial reconversion –, which illustrate the challenges of industrial reconversion in Chinese medium-sized cities.

2. The discontinuous temporalities of urban planning in Datong

In 2008, Datong’s mayor Geng Yanbo launched massive investments in real-estate and in construction, in order to achieve an ambitious remodelling of the city centre, turning it into a “cultural historical old city” (历史文化古城 *lishi wenhua gucheng*). According to the former city mayor Geng Yanbo, “history is the only possible path for Datong’s future”, because the city manages some of China’s most famous historical sites¹. Rebuilding the ancient city was a way to eliminate the coal stigma, to stimulate the economy and to get a promotion for Geng Yanbo. The political term is a potential platform for political promotion inciting local cadres to carry out ambitious urban planning projects, all the more visible in small and medium-sized cities (Chien and Zhao 2015; Li 2017). In Datong, political leadership was always unstable (Eaton and Kostka 2012) and Geng Yanbo himself was appointed mayor after several promotions in small cities in Shanxi. Following this long trajectory of promotion, Datong’s mayor gave great importance to urban marketing and to the production of city image through the promotion of tourism and through international events with specific facilities (Chadoin et al. 2000; Rousseau 2013), Mayor Geng’s project was to rebuild the entire city centre according to a “traditional” plan and to redesign the area into a space dedicated to tourism.

The city authorities thus implemented a major urban renewal program aiming at providing a “beautified” and sanitized city centre. The huge investment of five billion yuans to entirely rebuild the 7,4 km-long “ancient” city wall

Note 1
See the film “The Chinese mayor”, 2015.

Figure 1
The newly built ancient city wall (Datong, October 2015).
(Source: author).



is an illustration of the size of local public investment.

Other projects, like the reconstruction of the Ming-era Dai Palace, needed very high investment from the city government.

The urban population of the city centre was massively evicted: 2,352 families were evicted in 2008, and 6,163 families were evicted in 2009 according to official reports².

However, after the mayor was transferred to Taiyuan, the period of expansion was followed by a sudden suspension of all projects. One can understand this situation through several drivers. At the central level in 2014, the public authorities took new measures to limit the local debt and implement the rationalization of local public finances (Clarke and Lu 2016). Shanxi province also experienced large-scale anti-corruption campaigns, which resulted in a very cautious climate: in Datong, following Geng Yanbo's transfer, the party secretary was investigated and detained³. Finally, the crisis of the coal industry led to the slowing down of the construction projects in Datong⁴. Because of its size and of its numerous unfinished buildings, the half-built half-demolished city centre constitutes a revealing case study on the oscillating temporalities of urban construction in the city centre of an industrial city, a context which has been less studied than other failed booming "new towns" like the New District of Kangbashi, left empty and with many unfinished buildings in the industrial city of Ordos in Inner Mongolia (Ulfstjerne 2017).

The next years were characterized by inaction in the field of urban planning. The construction slowly started at the end of 2016: achievement of the ancient city wall and other major projects. The city was chosen to host several provincial and national level events such as the Shanxi province conference on tourism which was held in September 2017. Yet the discrepancies of the project display a fragmented urban space in the city centre, providing a complete map of all kinds of abandoned buildings: vacant lots left empty or used as temporary parking spots, demolished 100-years-old residential houses (平房 *pingfang*), disused commercial facilities from 1990s such as shopping malls (商场 *shangchang*) and hotels are all targeted for demolition; half constructed old-style buildings were also left abandoned.

This striking urban landscape, made of all types of ruins, is the result of complex interactions between the political temporalities at the city and at the central level, the economic context, and the logics of various actors (urban planning bureaux, real-estate companies, inhabitants, demolition crews).

3. The economic discrepancy of the declining coal industry: from prosperity to the crisis

Our ethnographic study tried to understand how a massive state-owned company (TM) faced challenges of legitimacy when the crisis of the coal industry broke out in Datong. Black coal has always been central in the local economy of Datong and Shanxi province. It was an element of the stigma-

Figure 2
New Dai palace in construction (Datong, May 2017).
(Source: author).

Note 2
"da chiqian da xiumiao, Datong shizhang Geng Yanbo zaocheng ji" (Big Demolition, big temple construction, notes on Mayor Geng Yanbo city construction), *Xinhua She Liaowang Dongfang Zhoukan*, 24 November 2009, <http://www.sx.chinanews.com/news/2011/0106/31077.html> (accessed on 14 November 2017).

Note 3
See for instance "Leadership shake-ups raise fears of a stall in Shanxi city's drive to remake itself", *Global Times*, 26 October 2014, <http://www.globaltimes.cn/content/888341.shtml> (accessed on 1 February 2019).

Note 4
On-site observations between October 2015 and May 2017.

Figure 3
Residential ruins, unfinished new buildings (Datong, May 2017).
(Source: author).



tization of the city as polluted and dirty. The coal industry in China has an unstable trajectory especially in the reform era, oscillating between deregulation through the flourishing of local mines (Thomson 2003), and re-regulation by the public sector at the end of the 1990s (Wright 2012). Despite the efforts to limit the negative impacts of coal extraction in the city since 2006, the recent economic crisis in coal prices and the central authorities' decision to end overcapacity in the industrial sector affected even more TM's development perspectives.

The transition from coal suggests an uncertain moment, a floating crisis, inviting the researcher to reflect on the processes of economic and social decline (Ferguson 1999). This economic temporality gravitates around TM, a large state-owned company, which inherited many of Datong's coalmines after the restructuring of the coal industry in 2008⁵. The coalmining economy has been restructuring since the 1980s. State-owned enterprises (SOEs) no longer constitute "total organizations" (Eyraud 1999), and can be understood under the concept of "neo-danwei" (Cliff 2015). Even if they no longer provide lifelong jobs with social benefits to the workers (职工 *zhigong*), these SOEs are still more involved in internal social welfare (社会福利 *shehui fuli*) than ordinary companies. Following the coal crisis, the mining district a greening process of the lands (绿化 *lühua*) while developing new energy (solar)⁶.

Secondly, the connections between these areas and the centre of the district became less and less frequent, some mines being only accessible with a small collective minibus every hour. Moreover, since 2012, TM opened a coalmine museum around a disused shaft and aims to start writing the local coal history "because the coal industry will end soon"⁷.

4. Social discrepancies: when the urban centre goes east

Social discrepancies appear, as the shifting gravity centre of the city tends to push urban development towards the eastern parts of the city in Datong's new district. The interviews I carried out in Datong between 2015 and 2018 show that many residents of Datong were quite enthusiastic about their city's new post-industrial identity. On the eastern parts of the city, where there used to be villages and farmlands, a new district is born, attracting both the local population and new investors around new poles of development: university, high-tech zone, high-speed train station, new residential compounds, etc. The city administration has moved in their new headquarters just near Shanxi Datong University. Many local inhabitants have invested in the new district's apartments for "better environment", and "better education" for their children⁸.

Datong's gravity centre is thus transferring towards the east, confirming a radical transformation of the places and functions of the city. However, these transformations have been following different rhythms, and while the eastern parts of the city are now booming, the western peripheral industrial distri-

Note 5

Xia Yang, "Shanxi meigai kunju" (The difficulties of the coal reform in Shanxi), *Fenghuang Zhoukan*, 31 December 2010, http://blog.sina.com.cn/s/blog_629817350100ob2n.html (accessed on 3 November 2017).

Note 6

This information is based on a series of official regulations collected at the levels of Shanxi province, of Datong city, and of the mining district. Nevertheless the solar energy itself faces challenges, see for instance "Chinese subsidy backlog 'leaves solar projects facing bankruptcy'", *South China Morning Post*, 12 October 2018, <https://www.scmp.com/news/china/politics/article/2168270/chinese-subsidy-backlog-leaves-solar-projects-facing-bankruptcy> (accessed on 1 February 2019).

Note 7

Interview with the director of the coalmine museum, Datong, July 2016.

Note 8

Interviews, Datong, May 2017.



cts are still “in transition”. The mining district has its own “city centre,” where the coal miners concentrate, while coalmines are slowly depopulating. These different landscapes and contrasted social profiles in the city, when studied together, are a way to follow more carefully mechanisms of urban development in China’s transitioning resource-based cities facing a dramatic turn⁹, and the importance of social discrepancies in this context. By studying the last inhabitants of “shantytowns” (both in the city centre and in the mining district) and comparing these working-class lifestyles to the way other social groups invest in newly-built residential compounds, my fieldwork leads me to raise the issue of social integration and marginalisation in Datong.

Note 9

See “Reform or ruin: Chinese cities on the edge”, *ChinaFile*, 11 October 2018, <http://www.chinafile.com/multimedia/photo-gallery/reform-or-ruin-chinese-cities-edge> (accessed on 18 November 2018).

5. Conclusion

This chapter studies the shifting gravity centre of the resource-based city of Datong from coal city to the “blue sky”, following the ambitious remodeling of the city centre into a “cultural historical old city” (*lishi wenhua gucheng*). However, after the mayor was transferred to Taiyuan, the period of expansion was followed by a sudden interruption of all projects, in a context of local public finance rationalizing, anti-corruption campaigns, and crisis of the coal industry. Because of its size and of its numerous unfinished buildings, the half-built half-demolished city centre constitutes a revealing case study on the discrepancies of urban construction in industrial China. Our research on the spatial and social change in Datong followed two dimensions of urban discrepancies in the city centre and in the mining district as a way to document a specific condition, when rapid urban expansion suddenly stops. After a period of acceleration and urban expansion, the political transition after Mayor Geng Yanbo’s and the coal crisis imposed new challenges to the city and to its inhabitants. Datong’s urban discrepancies offer new ways to analyse the irregularities of urban redevelopment, and industrial decline. An ethnography of these processes from below aims to explain more clearly the dynamics of social change in 21st century post-socialist industrial China. By studying interrupted and uncertain processes of displacement, demolition and (re)construction in two districts of Datong, this ethnographic study goes deeper into the spatial and social processes of urban transformation in the context of industrial reconversion, from the temporality of expansion to the temporality of decline. Finally, this perspective on the discrepancies of a construction boom aims to contribute to the studies of Chinese urban margins, post-industrial development, and failed architecture.



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T H I R D C A S E

RESEARCH ON ZHUHAI AND THE GUANGDONG PROVINCE



Chapter 5. Bridging smart to sustainability challenge of pursuing smart urban mobility in China

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Abstract

This article aims to critically review the emerging smart transport development in China from the urban sustainability's perspective. The study builds both on the analysis of the recent intensive academic debates, and on our field study in Zhuhai, China, one of the cities selected to experiment smart transport construction. The comprehensive planning of smart transport in the city is examined and scaled by strategic vision of sustainability. Our finding suggests urgency for China to fill the awareness gap between smart and sustainability, by shifting its techno-centric perception of smart to one that is people- and service-oriented, the only way to improve mobility conditions in their rapidly expanding urban areas.

Keywords: Smart; sustainable; chinese smart cities; transport planning; people-oriented; public transport.

1. Introduction

China is on its way to smart. In December 2012, the Chinese Ministry of Housing and Urban-Rural Development (MOHURD) launched officially a campaign of smart pioneer cities and issued its guideline for smart city development (MOHURD, 2012). Shortly after, a first batch of 90 experimental pioneer cities was announced. Other ministries joined the MOHURD from then on. In August 2014, consented by the State Council, eight ministries distributed jointly a new guideline for promoting smart cities development (NDRC, 2014). By the end of 2017, more than 500 officially designated and self-proclaimed smart cities were reported across China (Baidu, n.d.). The fallout of these smart transport projects is a national action plan for smart transport development released in 2017 by the Chinese Ministry of Transportation (MOT, 2017). Prior to this, the official website of Chinese government Chinahighway.com published an estimation of smart transport trend in the country (Chinahighway.com, 2015).

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Smart transport is generally considered as a key contributor to smart city. At local level, any city that engages in smart transport development begins habitually with the elaboration of a so-called “smart transport planning” (STP), a guideline document defining the goals of smart transport in the city as well as an action plan. An STP can either be integrated in the “smart city planning”, which is a comprehensive guideline for smart development of the city covering all sectors including transport, or be elaborated specifically depending on the city’s choice and the relative importance of the transport sector in the city. In the latter case, the smart transport project is led by a governmental organisation in charge of the city’s transportation, a “bureau of transportation” in most cases.

At its basic, smart transport is believed to hold promises of solving road congestions and upgrading traffic management in the rapidly expanding Chinese cities. As it offers concrete investment opportunities for physical urban and infrastructure development, it is popular not only among adopting cities but also among engineering firms. Here comes the essential question about the position of the emerging smart as regards to urban sustainability. After a short fever of cutting-edge technologies such as ICT (Information and Communication Technology) and Internet of Things (IoT), international scholars started to shift their focus to conceptual and practical connections between smart city and sustainable city. They recognize that the current smart initiatives throughout the world focus strongly on the development of intelligent technologies and their amalgamation with sustainability is far from taken for granted. They claim thus for a repositioning of smart development in the wider sustainability agenda and seeing smart as enabler to tackle core urban issues including land use design, urban services, community support, social equity, business practices, urban environment and ecological preservation (Albino, Berardi, & Dangelico, 2015; de Jong, Joss, Schraven, Zhan, & Weijnen, 2015; Kylili & Fokaides, 2015).

The recent remarkable review of Glenn Lyon (2016) interprets the connection between smart and sustainability through the prism of an innovated concept, named connectivity, by defining smart urban mobility as the “connectivity in towns and cities that is affordable, effective, attractive and sustainable”. This evident people-centric definition reveals a somewhat novel angle of consideration for smart: instead of thinking about smart technological possibilities, we think about people’s need of smarter connectivity. The people-centric philosophy forms the essence of this paper. By exposing the Chinese vision of urban smart transport emerging from its smart transport planning, we argue that the growing recognition of the limitation of smart technology in the West has yet received significant echo in China and that a techno-centric vision still forms the backbone of smart projects in the country. We claim that there is an urgent need to link smart to sustainability.



In what follows, we first examine the conceptual and practical connections between smart and sustainable drawing on emerging literature in this regard. The second part discusses the strategic visions of smart city and transport made in China, visions that we believe impede wider consideration of people and community needs. The third part forms a case study. The smart transport planning in Zhuhai, a reputed livable city and one of Chinese pioneer cities for smart transport development, is presented in detail, followed by profound analyses through the prism of people-oriented sustainability. Concluding remarks are presented in the last part.

2. Smart and sustainable: a conceptual approach

The conception of sustainability has been being actively debated in the last decades. No scientific agreement has yet achieved to date, though the description given by Brundtland Commission (WCED, 1987) is to be credited for the present day use. In the same token, the emerging smart city is a fuzzy and inconsistent concept, a fact that is recognized by the scientific community (Lee, Hancock, & Hu, 2014). However, intensive research since several years has somehow allowed for certain major-idea consensus. To illustrate, we can quote Caragliu, Del Bo, & Nijkamp (2011), for whom a city can be defined as smart *"when investment in human and social capital, coupled with investment in traditional (transport) and modern information and telecommunication infrastructure, generates sustainable economic development and a high quality of life while promoting prudent management of natural resources, through participatory governance."* This description of smart can be disaggregated into two components: the first component sets the goal of building smart ("generates sustainable ... natural resources"); and the second outlines conceivable measures to attend the goal ("investment in human...and telecommunication infrastructure"). Clearly then, smart telecommunication infrastructure should not be regarded as a goal of building smart but part of the measures to achieve the multi-goal sustainability. Besides, it is worth noting the last cause of the expression, which underlines one condition of prime importance for meeting sustainability outcomes -- "through participatory governance". In the same vein, the French think-tank Institut de l'Entreprise sets clearly participative as one of the three goals of smart city (Institut de l'Entreprise, 2013). In another review of smart city, De Jong, Joss, Schraven, Zhan, & Weijnen (2015) put smart in an even wider social-economic paradigm and declare that "...information technology is not considered on its own (according to the concept of smart) but should be contextualized and embedded in wider physical and social systems, thus allowing it (smart) to be at the service of people, business and government". Similar standpoint can be found in Lyon's review (2016), in which the author accredits Albino, Berardi, & Dangelico (2015) and points up that *"interpretation (of smart cities) now extends beyond being technology-centric to recognising people and community needs"*. As to the transport sector, Richardson refers to the definition of sustainability of Brundtland Commission and pronoun-



ced that a sustainable transportation system is “*the one in which fuel consumption, vehicle emissions, safety, congestion, and social and economic access are of such levels that they can be sustained into the indefinite future without causing great or irreparable harm to future generations of people throughout the world*” (Richardson, 2005).

The wider concern of social and people from the scientific world has obtained echo from political spheres. For example, the UK governmental program Transport Systems Catapult (<http://ts.catapult.org.uk>) defines intelligent mobility as “the future of transport -- harnessing emerging technologies to improve the movement of people and goods”. Similarly, in the blueprint of Smart City Lyon in France, integrating new technologies comes last on the priorities list, behind environmental and energy challenges, stakeholder network, and users (Invest In Only Lyon, n.d.). To a more practical perspective, the European consultancy Foresight made suggestions on how to render intelligent infrastructures sustainable, namely (Foresight, 2006):

- intelligent urban design that minimises travel needs;
- intelligent equipment providing information to users and service providers;
- self-adaptive intelligent infrastructure providing effective services;
- Intelligent use of the system by people with behavior change.

These conceptual speculations of scientists and policy specialists show a growing appeal to extend smart development beyond sole technological concern to wider ecological-social-economic ones. There thus is a need of conscious leap from smart to sustainability, in order that smart is at the service of making better city and better life for people.

Regrettably, these voices have yet received much echo in China. As well be seen, prevailed by the top-down pyramid planning system, the smart development in China keeps steeped in technological solutions without enough care about real-world problems and general interest of the civil society.

3. Smart city and smart transport -- Chinese style

The Chinese urban planning system has been recognized to be deeply influenced by the Soviet planning model, though the planning has taken on a very proactive role in strengthening economy and shaping market ever since the 1990s (Curien, 2014; Douay & Qi, 2016; Hu, 2016). In such a planning system, the government sets the overall rules of planning tame and supervises the progress of public and private operational players. As a key component of the planning, activities of urban transport are organized in a strictly top-down framework. At state level, the Ministry of Transportation (MOT) sets the strategic vision and regulation of transport planning in cities across the country



and supervises the action of its sub-level entities that are embedded in sub-level provincial and municipal governments. The sub-level entities, for their part, obey the orders of their immediate supervisor and act as local transport authorities by setting rules of transport activities and supervising public and private players.

It should probably come as little surprise why smart is on the way to sweep aside previous sustainable urban models, such as "livable city", "low-carbon city" and "eco-city", and become the new favorite of academics and politicians. Basically speaking, the smart label fits more the picture of providing integrated building and technological fixes, thus is more attractive to technology providers and investors. It legitimises somehow the growth-oriented entrepreneurialism in Chinese urban development (Pow & Neo, 2015). Despite the growing concern of making smart for sustainability as discussed in the last section, no significant echo seems yet found in China, where smart is ubiquitously regarded as a new cycle of technological revolution centered upon government actions for solving urban congestion and enhancing traffic surveillance. In this regard, we can quote as an example the interpretation of smart transport of Cai (2013), that smart transport is to *"integrate intelligent monitoring, communication, control, sensor, computer and internet technologies into transportation management system, to establish a wide-range, real-time, accurate and efficient integrated transport and control system"*. Arguably, this techno-centric vision, pragmatic can it be, may overlook the role of other key issues such as urban planning, multimodality, and coordinated municipal service. Furthermore, civil society is excluded from the elitist transport planning coalition, who ignores their needs and travel behaviors during decision making.

In the following section, the smart transport planning of Zhuhai will be examined. Being one of the five earliest special economic districts set by Beijing, and rejoicing at narrow connections with Macao¹ ever since, Zhuhai is recognized as one of the most affluent, most livable and most open-minded cities in China. It has also been selected as a Chinese pioneer city. The smart transport planning of Zhuhai can therefore provide an insight in the perception and orientations of smart urban transport in China.

4. Scanning smart from sustainability – the case of Zhuhai's smart transport planning

4.1 The city of Zhuhai and current situation of transport

Zhuhai locates at the west bank of the Pearl River Delta, facing the South China Sea, demarcated from the Peninsula of Macao by land borders and linked by waterway to Hong Kong and Shenzhen of the east bank of the Pearl River (Figure 1). Zhuhai covers a total surface area of 1724 km² and has a permanent population of 1.6 million². Originally a county composed of fishery land, Zhuhai had not become a prefectural-level city until 1979, when it was

Note 1

Former Portuguese colony becoming one of the two special administrative district (with Hong Kong) of China after its retrocession in 1999. With a large gambling revenue, Macao is now one of the richest cities in the world (Wikipedia, <https://en.wikipedia.org/wiki/Macao>).

Note 2

"Permanent population" refers to the registered population with "Hu Kou" of Zhuhai.



Figure 3 - 6
Zhuhai's urban environment.
(Source: Li Yinghao, 2018).

selected as one of the five "special economic districts" set by the Chinese government with the beginning of "Reform and Open" policy.

Zhuhai is the second largest port city in China, after Shenzhen, with three land ports separating the Main Land China and Macao, and five water ports. With a per capita GDP of 124.7 thousand Yuan (16 720 euros, data of 2015), Zhuhai is one of the most affluent cities in China. Zhuhai is also recognized as a livable Chinese city by its notable natural and man-made environment (coastline, mountains, Figure 2), its relatively low population density and a service-oriented industrial structure. In 2015, Zhuhai registered an annual tourist number of 20 million.

Figure 1 and 2
Location of Zhuhai.
(Source: Baidu Map).

Like most Chinese cities, Zhuhai has gone through rapid private-car increase since last decades. In 2016, the city registered 450 000 motorized vehicles, with an annual growth of 16.5%, the 13th consecutive annual growth of more than 15%. 359 000 were registered as private vehicles. Average per capital car ownership is 220 per 1000 persons in entire Zhuhai, and 343 in Central Urban Area (CUA) of 106 km² (Figure 3). Traffic congestion has emerged since the last five years, with clear patterns of morning and evening peak hours, where the average vehicle speed is 22 km/h (ZBT, 2015). Municipal bus and taxi are the two modes of public transport in Zhuhai. 1887 buses are operated on 163 lines by the public Bus Company. Bus passenger volume is 990 410 persons per day, with 51.7% passenger flux in the CUA, 22.9% between the CUA and periphery areas, 25.4% between the periphery areas, and clear shortage of offer during peak hours (Figure 4). According to the 2015 transport annual report of Zhuhai issued by Zhuhai Bureau of Transportation, transport by bus accounts for no more than 20.5% of the city's total mobility, lower than that of motorized transport (33.3%) including transport by private cars, taxis and motorbikes, and much lower than the target of 60% set by the State Council (State Council, 2013). The report specifies that the share of transport by bus in Zhuhai is "still quite lower than (world-class) livable cities such as Singapore (58%), Copenhagen (43%), and Vienna (36%)". The total number of taxi is about 1850, which assume 4.1% of the total mobility of Zhuhai's inhabitants

Figure 7
Zhuhai's Urban Central Area.
(Source: Baidu Map).



4.2 Zhuhai's smart transport planning

Zhuhai was selected by Beijing in 2013 as one of the experimental pioneers for smart city development, a national program led by the MOHURD. Six key areas were then identified to be developed, namely "smart transport", "smart industry", "smart city management", "smart public service", "smart social service" and "smart cultural inheritance". Short after, the Transport Planning and Information Center of Zhuhai (TPIC) was founded to pilot the smart transport. As an instance of the Transportation Bureau of Zhuhai (TBZ), the mission and responsibility of the TPIC are defined as: *"TPIC is the leading unit, implementation body and data center of Smart Transport of Zhuhai. It is in charge of planning all the sub-systems (of Smart Transport), making standards for data's collection, mining and management"*.

Besides, the Bureau of Science and Technology and Industrial Informatization of Zhuhai elaborated in 2013 a "Comprehensive planning for Smart City development in Zhuhai 2013-2020" (BSTII, 2013). Based on this planning, the TPIC missioned the Shanghai Urban Construction Design & Research Institute to elaborate a comprehensive planning of Smart Transport in Zhuhai (STZ). The planning, titled "Intelligent Transportation Systems Planning for Zhuhai" (ITSP hereafter), defines the framework of STZ will be composed of 11 sub-system planning, each corresponding to a specific area, embedded in a six-year timetable (2013-2020).

In the following, the 11 sub-system of the ITSP will be decrypted in detail, before being analysed through the prism of sustainability.

4.2.1 Integrated Transport Information Platform (ITIP)

This is a platform dedicated to traffic management of Zhuhai. It will be charged of "the gathering of traffic data, its analysis and release, in order to support decision-making (of traffic management)". According to the Planning, the ITIP will act at term as the main channel of transport information in Zhuhai, in replacing the multiple service providers (bus, coach, taxi...). The platform will be composed of seven modules including transmission network (switching equipment, routers, optical cables etc.), GIS, one data center capable of warehousing 10 years' data, a visualization system, software for data storage and treatment, a broadcasting system and a security system.

Five sub-missions of the ITIP are defined:

1. standardization of data mining and approval procedures for the city's informatisation development;
2. coordination of institutional actors in data sharing;
3. development of cross-sector mobility services by coordinating multiple service providers;
4. decision-making support in planning, and traffic and emergency management.

Figure 8

People squeezing onto a bus at morning peak hours.
(Source: Li Yinghao, 2018).



4.2.2 Data collection and information systems

This subsystem concerns the collection, treatment of transport data and information provision to travelers. The goal defined by the planning is a coverage rate of 90% of the Central Urban Area by data acquisition infrastructures (loop detectors, video detectors, microwave detectors, on-board GPS and Beidou, electronic registration identification devices) by 2018. The whole system will enable the collection of data of the following fields:

- motorised traffic (saturation, section flows, lane occupancy ratio...);
- public transportation (location and speed of buses, passenger flows...);
- slow mobility (walker flows and density, location and utilization of shared bicycles...);
- static transport (parking availability...);
- passenger flows at scenic spots and big events.

The responsibility relative to the use and broadcasting of transport information of the entities concerned is defined as the following:

- Every organism concerned by the data collection (Bus Company, traffic police, etc.) continues to develop its projects and infrastructures and is responsible for the information broadcasting. For example, dynamic information at bus stop will continue to be managed by the Bus Company, as well as the installation and maintenance of the devices dedicated to information display (such as LED panels at bus stop).
- Pan-service information broadcasting related to multi-modal mobility will be the responsibility of the RPIC.
- The RPIC reports to Zhuhai's Transport Committee and support transport planning and management of the city.

4.2.3 Road traffic management system

This sub-system consists of integrating hardware and software to a "command platform" used by the Traffic Police Department. Three key construction areas are concerned in this sub-system: traffic lights optimization, traffic video surveillance and improved charge collection system. Dynamic traffic lights control will be deployed across Zhuhai. Two specific demands are considered in the traffic lights system: pedestrians and the future tramway Line 1. Traffic lights will be adjusted to prioritize the tramway. At crowded intersections, the system will insure a passenger waiting time under 90 seconds.

As in many cities in China, video traffic surveillance systems have been deployed across Zhuhai since some time, basically for monitoring traffic and capturing violations. The planning envisions an enforcement of the surveillance systems by 1) replacing progressively analog CCTV by IP cameras, and 2) adding cameras at major roads, intersections, and high-building roofs.



For the parking charge collection, which is considered part of the "intelligent traffic management", the planning makes the following recommendations 1) establish heterogeneous on-street parking prices to adapt spatial-temporal demand variations; 2) anticipate the demand of parking spaces during big events and while adjusting parking prices to discourage private cars use; and 3) implement a congestion charging mechanism in the urban central area.

4.2.4 Public transport

As mentioned above, Zhuhai's current public transport service relies on buses and taxis. This two-mode system will be enforced in the near future by the coming of tramway Line 1. With a view to an *Advanced Public Transportation System*, the planning recommends Zhuhai's Public Transport Group to set up an "integrated" public transport management framework and a dispatching center, aiming to ameliorate buses' dispatching, enable the collection and treatment of buses' circulation data, and facilitate information change between traffic management entities and traffic police.

The planning claims for an improvement of the fare collection system of public transport. The currently deployed smart card, "TongDa" (literally means commute and arrive), usable for buses and the taxis, is planned to be updated to cover the future tramway and inter-city commuters (the Zhuhai-Guangzhou train line). The five-year perspective is a one-card-for-all-mode ticketing system for all intra-city mobility across the Hong Kong-Zhuhai-Macau region³.

The planning recognizes that Zhuhai's public transport system provides today only "static" information such as buses' itineraries and bus stops' locations, and claims for enhanced capacity of real-time information provision to users. For this purpose, a bus location tracking system has already been implemented. The planning encourages the integration of bicycle mobility in the public transport management system by providing, for example, digital map of bicycle lanes to travelers. Last, the planning suggests gathering other information that can have an impact on the travelers including passenger flows at ports, ferry and airplane timetables and ticketing, real-time road conditions, and weather.

As to the taxi system, the planning includes two projects: 1) improving taxi dispatching at high-passenger-flow places including railway stations, ports and airports; 2) initiating taxi ridesharing and tackling the issues of security and fee payment.

4.2.5 Management of static transport

"Static transport" refers to car parking. This sub-system planning aims at developing an intelligent car parking system that integrates not only off-street garage but also on-street parking stalls, something yet common in Chinese

Note 3

The region of Hong Kong-Zhuhai-Macau, *Gang-Zhu-Ao* in Chinese, is a spatial conception defined by the national authority ongoing 2015-2016 for boosting growth of the territory, with the arrival (in the end of 2017) of the cross-sea bridge linking the three cities.



cities. Parking meters and sensors will be progressively installed to detect vacant parking places, provide this information to drivers, and guide them to the vacant place. Zhuhai is one of the leader Chinese cities in the field of on-street parking with 1121 places currently experimented along ten road sections. The planning envisions to: 1) extend street parking beyond experimental road sections onto several critical city areas including Gongbei port, Changlong vacation park and Jinwan aerospace exhibition center; 2) diversify payment options; 3) make additional time payment easier; and 4) update violation penalty mechanisms.

4.2.6 Roads and highways

Two solutions are proposed to consolidate the current traffic management on roads and highways: 1) installation and employment of more CCTVs at traffic spots; and 2) enhanced cooperation in traffic management with neighborhood cities to which Zhuhai is linked by roads and highways.

4.2.7 Emergency management

The planning envisions an improved alert system for incidents and emergency based on masses of data collected by the ITIP at term. A multi-level verification mechanism will be set up to overcome the uncertainty of the automatic detection system. The planning suggests developing a transport emergency response database based on the ITIP and in collaboration with public safety agencies concerned (police, fire brigade and so on).

4.2.8 Computerization of logistics

This sub-system concerns road logistics. Other branches of logistics such as telecommunication, ports and airport are not included. With an aim of providing appropriate transport facility support in case of logistic emergency, it is planned to establish digital communications between the ZTIC and logistic enterprises and their depot parks.

4.2.9 Information sharing with ports and airport

Zhuhai is a Chinese tourist city with significant passenger flows at the ports and airport. The planning requires the ZTIC to merge information of the ports and airport (lines, ticketing, custom inspection time and so on) and release on-time information on the ITIP.

4.2.10 Internet of Vehicles

Zhuhai has obtained approval from the Ministry of Sciences and Technology and the National Public Security Department for being a pilot city of a national "vehicles electromagnetic identification technics" research project. The planning suggests taking this as an opportunity to initiate Zhuhai's Internet of Vehicles (IoV) plan. Three areas are targeted to be developed in the next five coming years, namely: 1) vehicle information collection technologies based on the mixed GPS/Beidou system; 2) V2V (Vehicle to Vehicle) communication;



and 3) vehicles electromagnetic identification devices and technics.

4.2.11 Transport communication network

The planning proposes the built of a backbone communication network that is separated from public internet and dedicated specifically to the intelligent transport system. This implies the deployment of three infrastructures: 1) communication pipelines towards long-term transmission need; 2) backbone communication lines between the data centers of the different entities by redundant 10 Gibabit fibre ring network; and 3) a 300M-1.0G private wireless network.

4.2.12 ITS standardization and localization

A number of national ITS standards have already been promulgated in China, but they are not yet widely applied across the country. Zhuhai's Smart Transport Planning recommends local application of these existing standards as well as development of the city's own standards. Main tasks at this matter are: 1) complete the ITIP data collection standard that clarifies the requirement on data's type, spatial-temporal precision and others; 2) push on at-street parking standard; and 3) advance the ITS standardization.

4.3 A planning that overlooks public transport

Through the description of the Smart Transport Planning of Zhuhai above, one can easily see that it remains to be centered upon, if not exclusively, vehicle traffic demand. Four of the twelve sub-system planning (4.2.3, 4.2.5, 4.2.6, 4.2.10) are directly dedicated to improve traffic conditions of vehicles, while only one sub-systems deals directly with public transport (4.2.4) -- The focus of work is quite clear. This overlook of public transport in smart transport planning can somehow find its root in the guideline of smart city development of Zhuhai, issued in 2013, prior to the smart transport planning. In this guideline, the aim of building Smart Zhuhai is expressed as: *"Build up reliable infrastructure, create regional smart hub, create smart basement for industry innovation, and create harmonious smart model"* (BSTII, 2013).

Although as imprecise as official guidelines often are in China, this definition reveals the strategic vision of making smart Zhuhai, which is, to be short, branding city, attracting industry, and boosting economic growth. Put another way, creating benefice to the largest civil society is not seen as a priority in smart development, even if, as one may probably argue, the development of cities would finally be beneficial to their inhabitants through "trickle-down" effect.

Developing public transport services at the expense of private vehicles has been growingly recognized worldwide as the most tangible solutions to deal with the problem of urban congestion (Haghshenas, Vaziri, & Gholamialam, 2015; Wey & Hsu, 2014). While its China's close neighbors of East Asia like Japan, Korea (Nakamura & Hayashi, 2013) and Singapore (Haque, Chin, &



Debnath, 2013) seem have realized the importance of controlling private cars growth and devote great effort to setting up public-transport-friendly policies, China seems still in hesitation...

This is somehow perplexing in considering that the country has issued a number of state-level recommendations and guidelines for public transport development in cities, inter alia the instruction for prioritizing public transport in cities issued by the State Council in 2013 (State Council, 2013), in which authorities of different levels (state, province, city) are required to establish a strategic vision of prioritizing public transportation. Despite these encouragements from the top level as well as growing academic appeal, there is no sign that public transport would challenge the dominant consideration of vehicles by planners and politicians in a near future. Indeed, in any Chinese city, it is hard to observe anything for branding the city's bus service. Even a bus timetable sheet, a basic public furnishing in lots of countries, is hardly available in Chinese cities. On the other hand, private cars keep flocking into all Chinese cities without any significant controlling policy. At the moment when the study is taken, there are two to three thousand new license plates delivered every month in Zhuhai.

4.4 Miserable walking and cycling conditions

Bicycle sharing in Zhuhai is composed of both municipal and private shared bikes. Parked at 134 fixed stations, the 6500 municipal bicycles functions with a specific IC card, and offer a free rider for the first 90 minutes. One drawback to the municipal shared bikes is that they are mainly available in the urban central area.

Private shared bicycles have recognized amazingly rapid development during the last 2-3 years in China. Until 2016, 27 private companies offered tens of millions of brightly-colored cycles to 4.5 million users across the country (Qi, 2017). Several leading marks such as Mobike and Ofo have even initiated operations oversea (Singapore and London). Compared to municipal ones, the major advantage of these bicycles is that they are not attached at fixed stations. Someone can find an available bicycle at any corner of the city through smart phone application, unlock it by the same application, take it for journey, and put it anywhere convenient (sidewalk, store entry, etc.). Zhuhai is served by 4-5 marks with Mobike, Ofo and Ubike as the leading ones (Figure 9 and 10).

In contrast with the quantity of available bicycles across the city and the simple function of the phone-based rent systems, riding experiences can be frustrating. Personal use experiences of the aforementioned top-three marks by the authors of the present article reveal indeed several problems. The first problem lies in the service offer itself. The bicycles suffer from a number of design shortcomings. The saddles' heights of two of the aforementioned marks are not adjustable and quite low by default, which prevent the cycles to fit taller

Figure 9 and 10
Private shared bikes in Zhuhai.
(Source: Li Yinghao, 2018).



persons. The only one adjustable, Ubike, has much less bicycles than the other two thus is not as easy to find... Second, the distribution of cycles is so concentrated in urban central area that it becomes a headache of city management with unused cycles stacking on sideways, while the city's outskirts become very quickly a dessert of available bikes. At places outside the city central, a searcher for shared bikes may need to walk a long way before finding one that may be... broken. While there has been intensive discussion of the shared bike "congestion" problem in Chinese cities both in media (China Daily, 2017) and by normal citizens, the problem for us lays more in the management and distribution of bicycles than shared bike itself as an alternative mobility mode. As a consequence of the difficulty in finding a right bicycle, someone who relies on this new mobility service for his daily moving is obligated to deal with more than one service providers by installing their smart phone applications in order to be sure to find quickly an available bicycle when needed. Here comes the problem of cost. Although the cost of using each service, in the form of a refundable deposit of 300 yuan (50 US dollars), is not very high, it can be costly for a normal Chinese employee to pay for several ones together.

The second problem is related to Chinese urban design in which the position of cyclist is habitually overlooked. In the case of Zhuhai, if bike lanes in the central area can be comfortably large and flat, it is not always the case in peripheral areas. Depending on road section, bike lanes can be narrow or shared with pedestrian sidewalks, in which case the ground are made of bricks and extremely uncomfortable to ride on. Additionally, as sidewalk is the place where trees are planted and public equipment installed (electricity and telecommunication boxes, kiosks, bus waiting areas...), riding a bike at sidewalk can quickly become tiring and dangerous. Even in case where the pavement is of relatively good quality and not many walkers are present, cyclists will encounter the problem of truncations of the elevated sidewalk by the exit of residential and commercial parcels. The transition between sidewalk and the exit lanes are often sharp and badly built. Consequently, a cyclist will be forced to brake in order to get off the sidewalk safely, pass over the exit lane, get on the next sidewalk, and accelerate in order to reach a normal speed, before encountering very soon another truncation...

Thirdly and most desperately, bicycle lanes can often be occupied by undisciplined vehicles, especially during evening hours when road control agents are off work, which makes evening even more dangerous for cyclists.

If using bicycles is finally not a so convenient mobility option through the experiences explained above, walking is simply worse. Not to mention the long distance that one needs to walk from point A to point B due to oversized constructions and gated communities that suppress numbers of possible itineraries, the simple road intersection crossing is tiring and extremely dangerous. To detail, the majority of the streets in Zhuhai, like anywhere else in China, are large four-to-six-lane bi-direction vehicles roads. But the time for pedestrian



Figure 11

Desperate waiting time at street crossing under estival sunshine
(Source: Li Yinghao, 2018).

crossing is often short, 30 seconds for a two-lane crossing, with clearance intervals of only 3-4 seconds -- you need to run, not walk! Meanwhile, the waiting time can be up to 80-90 seconds at many intersections. Considering the vehicular speed limit, which is in general 50 km/h at a four-lane bi-direction road and 70 km/h at a six-lane bi-direction road, we can imagine how dangerous it is for a pedestrian to cross the streets even when traffic lights are present, especially in a society where respecting and prioritizing pedestrians is yet to come.

4.5 The bottleneck of data sharing in managing urban transport

At the lower end of technology and infrastructure development, raises the question of data exchange and sharing among stakeholders and interoperability of IT systems, recognized as a key contributor to smart city projects (van Winden et al., 2016). Zhuhai's authority has set data collection as one of the twelve themes in the planning and pinpointed the leader position of RPIC which, in representing the city's Bureau of Transport, has the right to ask the other public organisms to share unconditionally their data concerning urban transport (4.2.2). Nevertheless, complain of the representative of the RPIC during our interview leaves us perplexed.

"...We face today a bottleneck, the one of data collection...it is in fact very, very difficult to ask the departments (the public and private organizations in the smart transport project) to share their data...Often, scanning my face is more persuasive⁴ than the red-head documents⁵ for asking our partners to collaborate..."

In the academic world, there has been no shortage of attention on difficulties in data-sharing among governmental or non-governmental institutions in Chinese smart city projects. Scholars such as Qian (2015) and Wang & Dai (2014) points out major barriers for governmental organs to share their data, including:

- wish to become data monopoly;
- worry about data confidentiality;
- imbalanced power of the partitioned governmental organs and consequent lack of cross-sector synergy; and
- absence of standardization and technical tools (platforms) for data sharing.

If these problems are far from being specificities of China (van Winden et al., 2016), they are particularly exacerbated under the strict pyramid administration of the country, which leaves little space for horizontal interactions (de Jong, Yu, Chen, Wang, & Weijnen, 2013). The administration of any Chinese city is composed of a multiple of organs that belong to different "systems". Each system is a sectorial vertical organization headed by a state-level ministry, which supervises a successive of sub-level organs embodied in the administrative instances of the corresponding level. Taking the Ministry of Housing and Urban-Rural Development for example, this ministry supervises a Department

Note 4

"scan face", literal translation of the Chinese expression "shualian (刷脸)", which implies the use of personal relationship to bypass bureaucratic barrier.

Note 5

"red-head documents" means official documents in China.



of Housing and Urban-Rural Development embodied in a provincial government, supervising itself, say, a Bureau of Housing and Urban-Rural Development in the municipal government⁶. The main vocation of such a sub-level organisation is to deploy the basic strategies and decisions of Beijing across local territories following the guidelines issued by and reporting, exclusively, to its upper-level cadres of the same system, and has somehow the "liberty" of choosing to obey or not the city's government, although it is under the city government on the organization chart. Worse yet, since the functions within a system is strictly top-down and each system has its own interest in an urban project, intra-system interactions can hardly take place, not to mention dialogues with civil stakeholders (de Jong, Wang, & Yu, 2013).

Note 6

The titles of the organs can vary according to specific need, as well as the number of organs of a same level.

The problem is thus more organizational than technical, and has been largely recognized by international and Chinese researchers and professionals. Nevertheless, little evidence was found in Zhuhai's Smart Transport Planning of overcoming the segmented organization in the planning system. To elaborate, the overall planning is still divided into sub-systems planning. For each of the sub-systems, the "main organs" for implementation are explicitly defined, thus distinguished. Consequently, the entire planning is an aggregation of sub-planning charged each by different organs. From then on, it comes as little surprise that the institutional stakeholders are so passive towards the demand of data sharing -- why do we share our data if we have the choices to not do so?

4.6 Consequence of insufficient public involvement

The Chinese classic problem of absence of civil participation unsurprisingly reappears in Zhuhai's smart transport planning. Without intention to repeat critics on this matter by international researchers, we would only like to show here how the lack of public involvement can defeat an urban project in practice, by addressing the case of tramway Line 1 of Zhuhai.

The construction of this first tramway line in Zhuhai was approved on July 24th 2013. An Italian constructor was awarded the contract of providing the rail system with trains. The whole tram system was rapidly designed, built up and trains provided (Figure 7), when "technical problems" related to power supply cropped up, to which Italian and Chinese experts worked jointly on solutions during 2-3 years. The problem is finally resolved in August 2017, and the tramway experiment operations. Things seem to find a way out to continue, except that Zhuhai's city government suffers from huge pressure due to the project's delay. The pressure is not only from the top -- the provincial authority -- but also from the bottom -- the civil society of Zhuhai is highly suspicious and critical towards the tramway projects. The pressure is so high that at the time of writing, the whole tramway plan (5 lines across the city) is questioned with discussions of a possible replacement of tramways by... underground metros.



Figure 12

A futuristic tramway stop in Zhuhai.
(Source: Li Yinghao, 2018).

China entered the era of rail transport several years ago, with a fever for underground metro lines. As to tramway, or "light rail" habitually called in the country, is rarely considered by planners and authorities. The choice of tramway by Zhuhai's authority can thus be considered as an audacious but reasonable attempt, since for such a medium-sized tourism city, tramway can be esthetically interesting and more accessible (without surface-underground transit) than metro.

As can be easily understandable, it is normal that technical problems may occur in any engineering projects, no matter how mature the technology is. A natural attitude to technical problems will simply be to deal with them and find solutions to solve them. Changing the plan of tramways to a plan of metros because of technical problems is simply frustrating. The political pressure that Zhuhai's authority suffers from and the consequent putting into question of the tramway project have an apparent technical origin. But we argue that the root of the problem is somewhere else. Our free talk with Zhuhai's inhabitants including taxi drivers and public or private company employees reveal their major arguments against tramway: 1) that the tramway line seizes road space of vehicles; 2) that it is another "showcase wasting manpower and money", an "impulsive decision" of politicians; and 3) the tramway is an outdated colonial heritage⁷. In short, for a citizen out of planning profession, tramway is a product of 19th century foreign colonizers used nowadays by certain politicians for the purpose of branding their short-term political results, thus is opposed by the civil society even from the beginning of the project. The delay due to technical incident has only added the dose. Absurd can it be, this perception of tramway is indeed a tangible consequence of the lack of public involvement in planning process in China. If citizens in Zhuhai had basic knowledge of tramway -- its advantage, inconvenient and its level of expansion around the world, or even a basic explanation by planners or politicians about the choice of tramway in Zhuhai, such choice might have been approved by the public, at least psychologically, and their reaction to the technical problem and delay of the first line would have probably been much less irritant, the authority could have born much less pressure, and the tramway planning would be realized one day and benefit the large public.

Note 7

During the 1930's, Japanese military invaders constructed in the colonized city of Dalian (North-East China) a tramway line. The line has been kept today for tourism.

5. Conclusion

This study is one of the first in-depth critical reflections of smart city and transport development in Chinese cities built on on-ground investigation. It contributes thus to the smart city literature body, in particular to that of China. At a conceptual level, the study derives from an emerging body of empirical work on the connection between smart and sustainable, and puts forward the urgency of rethinking the smart city model as (nothing more than) a technological path for sustainable urban development. It points out also the apparently-pyramid but in-real-fragmented organizational of the planning system in



China that is maintained in the new-round smart-labeled city development, and the resultant serious undue emphasis on technological solutions, ignorance of people's concern and difficulties in data sharing. At a more concrete level, the study exposes the smart transport planning of Zhuhai, one of the most developed cities in China, which serves for illustrating its strategic vision of smart development. Building on detailed comprehension and interpretation of the planning, we delve deep into the undue technocratic consideration of the smart concept in China and discordances between the vigorous smart campaign across the country and the real difficulties of Chinese urban travelers passing unnoticed.

Smart transport hold promises of solving traffic congestions and efficient traffic management, but it is uncertain what it can deliver in terms of mobility service, where improvement depend on multiple factors and measures going far beyond high technologies. These range from transport-oriented development (TOD) to regulation of private vehicle growth passing by a diversification of transport service offers (multimodality). A combination of all those measures is the only way to make urban transport more diversified, more efficient, safer, less energy consuming, sustainable for short. It will be naive to believe that being technologically sophisticated leads certainly to smart. All depends on the circumstances technologies are implemented in, how they are articulated with local environment and culture, and how people adopt them in their daily life (Li, Bonhomme, & Deroubaix, 2018; Ngom-Dieng, 2015).

On the other hand, pursuing sustainability does not necessarily mean to resort smart technologies. The idea has been succinctly illustrated in Lyon's review (Lyons, 2016), where a journey by public transport can be proved to be efficient, safe, comfortable and joy without any sophisticated technological solution being involved. In the case of China, prioritizing buses in roads traffic, enlarging public transport network and diversifying public transport service, enhancing information broadcasting systems, ameliorating walking and cycling conditions in urban areas are all basic things that could be done with no need of smart high-tech, but certainly of great benefit to transport condition in cities. There is thus urgency for consciousness changing, from the technology-for-all conviction to one centered on people - people's need, concern and interest. We believe this change is one essential step to a smart development in real, one that allows bringing smart closer to sustainability in contemporary China.

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Chapter 6. “It spreads city to city”: The implementation of Guangzhou Bus Rapid Transit

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Abstract

To vary the scales of observation between different levels of public action, more or less directly involved in the production of a policy, is a way to articulate local, national, and possibly international dynamics. The comprehension of a policy in its entirety requires deconstructing of the center/periphery relationship so as to put the local power dynamics in perspective with the national instruments of public action, generally defined by cognitive frameworks that circulate beyond the boundaries of the nation state. By focusing on a transport policy’s actors, the ones of the Guangzhou Bus Rapid Transit (BRT), I will highlight their multipositionality in order to deconstruct the idea that a policy deployed at the city level would only be “local”. Both parts of an international and local elite, BRT’s experts enjoy a dual position of exporter and importer (as a local personality legitimized by an international organization). They therefore have a local reputation that allows them to be heard in the international field, and in return an international legitimacy that consolidates positions in the field of local power (Dezalay, 2004). By focusing on these actors, who mobilize different resources depending on the different spaces they are a part of, and who vary their presentation of self, we note that they participate in connecting territories and injecting a form of transnationality into public action, which is thus localized but not totally local.

I will first examine the center/periphery relationship within China, highlighting the dual dynamic between a form of centralism implied by the role of exemplarity as a national instrument of government (Heilmann, 2008), and the injunction to experimentation that comes with a relatively laissez-faire to local governments on some sectoral issues. I will then add a level to the analysis, to show, through the sociological trajectories of urban planners and engineers invested in the Guangzhou BRT issue, that the “international” can be used as a resource in the political making of a policy, retrospectively deemed exemplary.

Keywords: Bus Rapid Transit; Advocacy network; Urban policy circulation; Policy brokers; Transnational public action.

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1. Introduction

This contribution aims at introducing part of the empirical material collected in China during my mobility in the framework of the MEDIUM project. The analysis of my data, for the purpose of a future article, is still ongoing. I will therefore stick to a brief presentation of the first raw results of my field research.

This fieldwork was conducted in Guangzhou, contrary to my initial desire to focus on Zhuhai's sustainable transportation policies. Indeed, I faced difficulties in accessing the field in Zhuhai, which I was able to bypass in Guangzhou. The support of an NGO allowed me to have easier access to interviews, while they were very difficult to negotiate in Zhuhai. It was therefore the constraints encountered on the spot that pushed me to move away from my initial search plan.

Like much of Asia, China has seen its car fleet grow exponentially in the last decades. But this massive increase has caused many social issues, mainly because of its high population density in cities. As a result, the country is facing transportation problems that hinder its future development: transit system capacity unsuited to demand, reign of the car at the expense of cyclists and pedestrians, suboptimal urban design, etc. To alleviate these problems, public policies giving priority to public transport seem to be a solution, among which Bus Rapid Transit systems are an option (Duan et Fjellstrom, 2009). I will not question the relevance of this kind of public policies, of which I leave the evaluation to others, but I will focus on presenting the actors who defended the BRT, at a time when this solution, which is now part of the urban landscape of Guangzhou, was only one option among others.

BRT is a low-cost bus-based alternative to metro and tram systems. A BRT system is supposed to emulate the performance and amenities of modern rail-based transit systems, including segregated rights of way, closed stations, and pre-board ticketing. However, its advocates point out advantages over rail-based transit, including lower construction costs, relatively short implementation periods (less than three years after conception), flexibility to adapt to a range of urban configurations (Poiani, 2014 ; Wright & Hook, 2007). In the last few decades, BRT has become widely used for urban mass transit, especially in developing cities, that see it as a low-cost but supposedly high quality alternative to the metro. 170 cities around the world have implemented BRT systems, among which about a third are in expansion, and more than 120 systems are either in the planning or construction stages (Global BRTData, 2018). Among them, Guangzhou BRT, that opened in February 2010 is considered one of the most efficient BRT system in Asia and widely used as an example for cities to imitate. Taking into consideration quantitative criteria (daily



passenger demand, average speed, length of the buses, height of the sidewalk, distance from a station to the first intersection, etc.), which it would be necessary to study the production conditions, the system indeed was rewarded by numerous national and international prizes, that participated in the formalization of a good urban practice aiming to be replicated.

The purpose of this brief case study will not be to make any kind of technical introduction to the system. But by focusing on actors who carried the project in its early stages, I will try to demonstrate how the Guangzhou BRT is an interesting example of the international circulation of policy knowledge and know-how. The study of the genesis of the project, marked by a strong involvement of an international NGO and philanthropic actors as well as the World Bank and Asian Development Bank, illustrates the processes at work in the diffusion and adaptation of exemplarity. Guangzhou BRT indeed claims its roots, through the sayings of its stakeholders, in Latin America, especially in Bogota, Colombia, thus being an example of the international dynamic of cooperation and of sharing of experiences and good practices regarding urban issues (Halpern & Galès, 2011). This circulation process relied on the constant implication of organizations, whose individual actors participated in the structuration of a community with wide technical, relational, financial and symbolic resources.

Before presenting the case study I'd like to make a short parenthesis about my choice of using the term "circulation" rather than another, such as transfer. It seems necessary to introduce this concept, widely commented by geography and political science literatures, that should be kept in mind when trying to grasp the complexity of policies' movements.

The notion of policy transfer, developed about twenty years ago by Marsh and Dolowitz (1996) presents a quite mechanical process, underpinning but not really taking into consideration the actors, on who it is necessary to focus on. It also qualifies transfers in terms of success or failures, without really considering adaptation and translations of policies. This is mainly why I prefer to use the notion of policy mobility, or even the one of policy circulation, which really focuses on actors, communities they are a part of, their resources, their political work to diffuse and adapt solutions from elsewhere (Mazeaud, Nonjon & Parizet, 2016). Circulation is sensitive to movements of ideas, models and instruments, in short to the phenomena of alteration and hybridization that can take place through the disintegration from the place of origin and re-settlement in the import territory (Béal, Epstein & Pinson, 2015). It also recognizes the impact of the experts and examples of best-practices on local urban politics.

The global circulation of policies and expertise are shaped by, and also shape, social connections made by various policy actors. These connections, relationships and bonds are sometimes made at a distance through digital tools, but they are also face-to-face encounters, such as meetings, international conferences, and in our case crucial site visits (Cook & Ward, 2012 ; McCann, 2011). Visits and events such as congresses, conferences, indeed are



key momentum that bring together actors from different local contexts, among them some who carry knowledge and know-hows identified as good practices (Siméant, 2012).

In the case of the circulation of the BRT solution, the technical expertise, which the empirical study tends to show as the prerogative of two professional communities, urban planners and transport engineers, is a major issue. A form of institutionalization of this expertise, through the implementation of international standards that raise quantitative indicators as common references, participates in the formalization of good practices.

From a methodological point of view, an entry by the individual actors, particularly through biographical interviews and a participant observation to capture daily practices, had everything to gain from being coupled with a careful follow-up of the documents they produce and that are a strategically mobilized tool. I thus structured my field around three methodological entries: semi-directive interviews, an analysis of the “gray literature”, a participant observation in a non-governmental organization promoting the BRT. The three weeks’ observation I spent in the Guangzhou office of the Institute for Transportation and Development Policy allowed me to observe the concrete work of an organization whose purpose is the promotion of “sustainable” transport solutions, and to grasp more precisely the resources they have. The modest size of the structure (in Guangzhou less than a dozen employees) and the excellent English of the employees, which compensated for my modest level of Mandarin, allowed me to be quickly integrated and eventually to be able to trace their life trajectories, which was a starting point to understand what pushed them to pursue a career in a non-governmental organization, when they could, for instance, claim a more substantial remuneration within a municipal planning agency. Thanks to some of them, I have also been able to negotiate interviews with other representatives of foreign NGOs with whom ITDP has ongoing collaborations.

2. From a World Bank project to an NGO driven solution

The Guangzhou BRT is considered to be, according to technical indicators, one of the most successful “metro level replacement” outside South America, and Mr Liu Baochun, Director General of Foreign Affairs Office of Guangzhou Municipal Government and Secretary of Metropolis Asia-Pacific Regional Office, in a speech during the 20-20 meeting convened by Cities Today in London on 1-2 July 2015, acknowledged the help of policy circulation in effective global governance, highlighting that the success of Guangzhou’s transport system comes from lessons learned from other cities, especially in South America.

First, let’s have a quick look at the project timeline. Even though the conception of the BRT started in 2006, its very first steps took place in late



2003. This year, a World Bank consultant, who at this time already had numerous professional experiences in Southern Asia, was invited to Guangzhou by the World Bank urban transport project manager in order to review new bus lane proposals. Considering his knowledge of urban transport solutions and the data he had about Guangzhou, especially demographics ones, he suggested to let go of the current project and to instead consider a BRT one.

At that time, most officials were quite skeptical because, among others, of the relative past failure BRT projects in China. World Bank officials as well as Guangzhou Municipal Engineering Design and Research Institute project manager, and Construction Commission staff were not ready to go that easily. But eventually they got convinced and the project was implemented quite quickly. Following a site visit in Latin American, a formal feasibility study was indeed asked for by the Mayor. Soon after that, conceptual and engineering designs were made, all with the technical support of foreign experts, and after one year of construction the BRT eventually opened in 2010.

When the story is officially told, it seems quite simple: The Mayor and his staff went to Bogota for an official visit, which allowed them to see what an efficient system BRT was, they immediately liked it and decided to implement it back in Guangzhou. The reality is a bit more complicated, as you may imagine, and some shadow but key actors should be mentioned, as they acted as policy brokers.

Back in 2004, the consultant I previously mentioned suggested Guangzhou should improve its transport system by constructing a BRT line in the central area of the city. As his advice was not to be heard he suggested to the World Bank, through a NGO he also worked with, the Institute for Transportation and Development policy (ITPD), to issue official invitation letters to the Guangzhou Mayor's office. His lack of local anchorage, implying a low degree of confidence despite his in-depth knowledge of a proven solution elsewhere, was thus circumvented by the symbolic support of an organization which, despite its own lack of local expertise, had a fame to which an individual could not claim alone. While the World Bank eventually accepted, he mobilized his NGO network to set a site visit that would be as impactful as possible. For the main defenders of the BRT solution, it was about structuring a community of actors that could work together to carry out the project: political actors, philanthropic foundations, international organizations, technical experts, etc. The main challenge of this trip was thus to encourage the beginning of a relationship between individuals who would ultimately form a world of interconnections, in which each would have one or more forms of resources: financial, relational, symbolic or technical expertise.



3. Policy brokers as a link between local and international actors

Overall, my investigation pointed out three main categories of actors. I propose a categorization for the sake of clarity, but I acknowledge that using this gives a highly-simplified vision of reality. It is first necessary to note that the individual actors, part of the mentioned organizations, are often straddling between different institutions and therefore categories. Moreover, the terms "national" and "international" should not be taken in the absolute. One must not fall into the trap of essentialism: nothing is "local" or "international" in itself. Guilhot (2005) uses of the notion of double agents (even triple agents, since affiliations are multipliable) when focusing on the promoters and protectors of democracy. In his book, *The Democracy Makers*, he mobilizes the case of the institutionalization of skills, of an expertise around democratic reform, to show, by looking at its institutions and actors, that there are no real barriers between the national and the international, the government and the non-governmental, the scientist and the activist, which according to him are distinctions built rather than de facto ones, insofar as in practice multisituated actors never act in a sphere with closed borders. The categories I am proposing here briefly must therefore be questioned, which I am working on, in order to reflect the diversity within them and the reality of the multiple positions occupied by the actors who are part of them. This being said, let's try to clarify who we deal with.

First, we shall mention actors that we will call "local". They are structured around organizations such as the Guangzhou Mayor's office, which is ultimately the decision-maker, and more technical institutions acting as advisors. As the link between the field and political actors they assume a role of translator/prescriber. Guangzhou Municipal Engineering Design and Research Institute (GMEDRI), and Guangzhou Construction Committee, both have substantial influence on the Mayor's Office as they work closely together on a regular basis and translate technical issues into terms the decision makers understand, thus being able to tell their personal vision of an issue and influence the weighting of information streams in the policymaking process. They translate into political recommendations technical considerations, supported by their knowledge of the field and their professional eye of urban planner, or engineer.

It should be kept in mind that these actors involved on the local territory, whether there are political, administrative, or more technical advocates, are not one hundred percent "local" as most of them cultivate national ambitions or even international ones; because the political staff circulates, during their career, between the Chinese Provinces; because most of them take part in professional trips abroad; because they are the promoters of the city abroad; or because they nurture contacts with foreign actors, and thus lead a form of city diplomacy.

On the opposite side, some actors could be qualified as "international", as they are not continuously present on the local territory and, mainly, because



they present themselves as such. In this category we find international organizations, such as the World Bank, philanthropic foundations, NGOs, more or less independent consultants. Sometimes criticized by more territorially integrated actors of a project, who consider they lack field knowledge (this criticism was frequently made towards the World Bank by my interviewees), at the same time they are often taken as a symbolic caution and as proof of the almost universality of a solution. The claim of the internationality of an organization as one of its primary characteristics is thus both a resource and a constraint, placing these structures and the actors who compose them in a form of ambiguity.

Finally, between the two above mentioned categories, policy brokers are both part of international networks and have a strong knowledge of local dynamics. Among this category, experts (widely designated as such by other actors), mainly polarized around the Institute for Transportation and Development Policy, are characterized both by the technicality of their profile and by a form of militancy. For the sake of brevity, I will not develop this point here, but these actors claim an environmental conscience which, despite different personal objectives and interests, constitutes a form of symbol to which all can refer (Strauss & al., 1963).

They are characterized by international trajectories, with long period of time spent abroad, by their frequent attendance of events that could be described as "great masses" to use the words of Johanna Siméant (2012), they are part of transnational networks (formal or not), and claim a fine knowledge of the dynamics of local power. All of which allows them to play a role of connector between the actors and by extension the territories.

The New York-based Institute for Transportation and Development Policy, which today has opened offices in 6 other countries, including two in China, is an American non-governmental organization that, through its resources in terms of expertise and relational capital, plays a central role in the structuring of the Guangzhou BRT's actors.

ITDP is an NGO founded in 1985 by sustainable transport advocates whose aim was to fight the export of costly and environmentally damaging transport models to developing countries (any solution that would favor automobile to public transport). It is headquartered in New-York and now has offices in Brazil, China, India, Indonesia, Kenya and Mexico. In 2017, it employs about 80 people, mainly urban planners, architects and transport engineers. It aims at participating in the implementation of "high quality transport systems", and of public policies that would make cities "more livable, equitable, and sustainable". For this, it counts on its technical expertise, the exemplary nature of its projects, its international network of knowledge, its publications in support of its "political advocacy". It prides itself on having successfully advocated, in their first ten years, with the World Bank and other "multilateral institutions" to reorient their lending conditions so that they promote more multimodal transport solutions instead of road projects.

Box 1

A few facts about the Institute for Transportation and Development Policy.



Note 1

All above mentioned facts about the organization are based on its website: www.itdp.org Last accessed on 26 Nov. 2018.

ITDP organizes its work around “8 principles for better streets and better cities”: Walk, Cycle, Connect, Transit, Mix, Densify, Compact, Shift.

Among the tangible solutions it promotes, the most emblematic is the BRT, which it has actively encouraged since the end of the 1990s and for which it is today a world expert reference. ITDP also advocates, among others, NMT solutions (non-motorized transportation - bicycle, market ...), TOD (Transit-oriented development), offers expertise on parking issues, TDM (Transport Demand Management), and shared mobility¹.

ITDP publishes a journal issue per year (Sustainable Transport magazine), the format of which has changed little since it was first published in 1993. It consists of a series of case studies, written by employees of the presented project, and/or by or with members of partner institutions. It also produces many standards, guides and studies on cross-cutting themes related to sustainable transport. In June 2018, the Rio office, for example, published both in Portuguese and English a document on the accessibility of the city for women and children.

The ITDP China office was implemented in 2004 to support the Guangzhou BRT project and, at this time, employed only one person, the now former regional director. Between Guangzhou and Beijing, ITDP China now employs a dozen person – most in Guangzhou. Its most iconic projects in China are the Guangzhou, Yichang and Lanzhou BRTs. Outside of China, it has participated in numerous projects in Asia (Manila, Vientiane, Ulaanbaatar, Kuala Lumpur ...). It is currently also providing technical support to the Kenyan team on a BRT project, coordinated by UN-Habitat, in Cairo.

ITDP is at the center of a network of NGOs, foundations, private research centers, which are the main sponsors of the BRT circulation, since they feed a large network of experts, funders, and have an address book filled with political figures willing to advocate the solution to their foreign alter-ego, thus to become political entrepreneurs. The actors I interviewed indeed share a feeling that you can be the best expert in your field, there is one thing an expert has great difficulties with: convince a mayor, a governor, whoever makes the formal decision, that the policy recommendation is worth the risk. One of the persons that can provide a convincing answer is widely considered to be another official. So, putting officials that have implemented best practices together with officials who are contemplating change seems to be a very powerful combination.

ITPD also maintains a technical dependency link with international organizations such as the World Bank and the Asian Development Bank, each of which relies on its expertise, particularly to train their locally-responsible executives in transport projects.

Within this network, ITDP has therefore made itself a special place. By opening offices in several geographical areas, it claims not only a fine knowledge of a solution that has proven to be efficient elsewhere, but also an ability to understand local contexts, or at least national ones. The urban planners and



engineers working in the organization embody this form of ambiguity, that I have already mentioned about the so-called international actors, between suggestion of recipes that have already made their proofs elsewhere and a form of recognition of local particularism.

I would like to point out that almost every actor, at least every one of my interviewees, is multisituated. A project manager in a NGO can have held a position close to a local political decision-maker, with whom he or her still maintains a cordial relationship, and now perhaps consults for an international organization.

But one of the reasons some organizations, particularly ITDP, can be considered as key organizations in the circulation of the BRT solution is due to the great mobility in the careers of its actors, who during their life, life marked in particular by long passages abroad, were able to constitute a network they can mobilize at work.

I would like to give two very quick examples. The former ITDP regional director was educated in Australia, previously worked for a German organization in Indonesia, has been a consultant for the World Bank in Thailand, joined ITDP specifically to work on the Guangzhou project, and after leaving the NGO has set up a company in Guangzhou that works very closely with the Guangzhou Municipal Engineering Design & Research Institute. The current regional director, while having a different path, also holds part of its legitimacy by his long international career, during which he got strongly involved in what he considers to be environmentally meaningful projects. He grew up in China, holds a master's degree from an American university, worked in the United States and China as an urban planner, then in Switzerland as a portfolio manager for a philanthropic foundation, through which he became one of the first funder of Guangzhou BRT, before being recruited by ITDP, that he has known for years.

If we cross the trajectories of current and past employees we note that the passage abroad, either upstream or during their journey to ITDP, is a resource that participates in the construction of their legitimacy.

Thus, an organization is not essentially a policy broker, a circulation agent, but it is collectively constructed as such by the actors who give it impetus and are of course influenced in return by a form of institutional culture.

4. Conclusion

So, the Guangzhou BRT project mainly relied on informal networks, in the center of which multi positioned individuals, supported by formal structures such as NGO and philanthropic foundations, had the social resources necessary to mobilize symbolic, political and financial support and connect them together. We here have an example of policy brokers whose expertise on a particular issue and international personal relations allowed them to be match-makers between public policy makers. From organizing site visits to providing technical support, they are key actors in the circulation of a solution that has



been widely diffused as a good practice, formalized by a systematic recourse to standardized technical indicators. These first field results are still very raw and need to be sharpened, which I am currently working on. However, I can now say that the empirical investigation that I have conducted will provide, to a modest extent, some elements to the sociology of transnational public action.

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Chapter 7. Evolving accessibility landscapes: mutations of transportation networks in China

Juste Raimbault

Abstract

Recent years have witnessed an exceptional extension of public transportation networks in People's Republic of China, both at a national scale with the construction of the first HSR railway network of the world, and at local scales with numerous cities developing high coverage subway networks often from scratch. This chapter studies these mutations, both from a qualitative perspective with fieldwork observations and from a quantitative perspective with the study of the evolution of population accessibility landscapes, at a national level and for several cities. We confirm that rebalancing planning objectives are well achieved in terms of accessibility at both scales, when all planned lines will be achieved but already in a significant manner. We finally hypothesize possible paths for the coupled network-territory systems, given the extent without precedent of such mutations.

Keywords: Transportation networks; accessibility; HSR; urban transit; Pearl River Delta.

1. Introduction

1.1 Accessibility in territorial systems

Cities and their future form of large urban metropolitan regions are a well-known gordian knot of the sustainable transitions, as they concentrate many apparent paradoxes of concurrent positive and negative externalities, but also more intrinsically as they are the incubator of social change and innovation (Pumain et al., 2009) implying a complex role of their physical structure in processes of decoupling growth with environmental and social negative impacts (Bergeaud et al., 2018). A crucial aspect of the structure of these territorial systems are transportation networks, as activities and flows strongly depend on these at multiple scales (Raimbault, 2018a). For example, the development of efficient public transportation systems is crucial to reduce car use, decrease local pollution and global emissions, and enhance geographical equity (Sinha, 2003). Accessibility, in its broader sense including effective but also potential access to different amenities (Bavoux et al., 2005), is a way to quantify the potential impacts of a transportation network on a territory. The evolution

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of the spatial distribution of accessibility, that we will denote here to simplify as accessibility landscapes, following an evolution of a transportation network is thus a relevant entry into these issues.

China, which is concerned by severe air pollution issues and is a significant contributor to global emissions, has in the last decades initiated profound infrastructural changes to develop inter-city rail transport and urban rail transit, expected to have a significant impact for greenhouse gases emission mitigation (Han and Hayashi, 2008), although much remains to be done in terms of total efficiency of the transportation system (Chang et al., 2013). Jiao et al. (2014) show the role of the High Speed Rail network in the national accessibility, with a remarkable uniformization of accessibility for a large majority of the population. We will generally here use the concept of accessibility defined as potential entities or services reachable given a fixed travel time budget, in the spirit of generalized accessibility introduced by Hansen (1959). This can be compared to the evolution of the Chinese railway network during the 20th century as studied by Wang et al. (2009), for which accessibility was more unevenly distributed. Hou and Li (2011) establish the temporal evolution of accessibility in the region of Pearl River Delta for different transportation modes. Lyu et al. (2016) tackle the issue of accessibility in Beijing by classifying territories in the perspective of a Transit Oriented Development, i.e. a territorial development aimed at encouraging the use of public transport.

We study in this chapter the recent transformation of Chinese transportation networks from complementary point of views, namely a quantitative analysis of recent accessibility gains due to public transport development and a qualitative description of the impact of some transportation projects, in order to give a broad overview of this mutation processes and their implication in terms of accessibility. The rest of this chapter is organized as follows: we first give some elements of context of the urban environment in which the transportation networks are inserted and the related governance issues. We then develop some case studies, namely road accessibility in the Pearl River Delta in relation with the new Hong-Kong-Zhuhai-Macao bridge, urban rail transit accessibility in major cities, and High Speed Rail accessibility at the national level. The next section is aimed at complementing this overview with fieldwork observations. We finally discuss the implication of these results for future trajectories of these territorial systems.

1.2 Transportation governance and Mega-city regions

The development of transportation infrastructures is closely related to the governance context in which it is decided. Tang and Lo (2008) show for example the importance of maintaining long-term transport policies in the case of Hong-Kong, to avoid negative externalities as a consequence of a short-term planning. It was however recently shown by Aveline-Dubach & Blandeau (2018) that despite drastic change in Hong Kong MTR strategy, switching



from a development-based to a management-based approach, the strong interdependency between the components of the “Rail-Property” model still mitigates the potential risks of deterioration of the level of service of public transport. Therefore, the question of the temporal and spatial scale at which planning is done and of governance structures adapted to the actual urban functional and morphological structure is crucial. In particular, a new form of urban development which is interpreted by Le Néchet (2017) as the most recent transition of settlement systems, namely the emergence of large polycentric urban regions, is closely related to the question of developing integrated territories through infrastructure networks and the governance of these.

The notion of megalopolis has been introduced by Gottmann (1961) to describe the emergence of urban agglomerates at a scale that did not exist before. It is at the origin of the concept of *Mega-city Region* (MCR) which was defined by Hall and Pain (2006). For the European case, they unveil a number of urban regions which are strongly connected regarding mobility flows, connections between companies, which correspond to what they call polycentric *Mega-city Regions* (for example Randstad in Netherlands, the Rhin-Rhur region in Germany). Their characteristics are a certain geographical proximity of centers, a strong integration through flows, and a certain level of polycentrism. It consists in an urban form that did not exist before, which emergence seems linked to globalization processes, as suggested by Le Nechet (2017) which formalizes this as the most recent structural transition of human settlements. This concept is even more relevant with the recent emergence of new types of urbanization, in particular through the accelerated urbanization in countries with a strong economic growth and undergoing a very rapid mutation such as China (Swerts and Denis, 2015).

Ye (2014) analyzes the actions of metropolitan governance at the scale of centers of the Pearl River Delta MCR, and more particularly how municipalities of Guangzhou and Foshan have progressively increased their cooperation to form an integrated metropolitan area, what can thus strongly influence the development of transportation for example and allowing the construction of a connected network. The emergence of this structure may be due to the tension between top-down planning processes imposed at different levels by the Central State, the provincial and the local governments, and bottom-up processes of production of the built environment through the interactions of actors, in which the State also plays its role. The competition with other cities in the MCR remains strong, and the logic of integration (in the sense of articulation between the different centers, of interactions and of flows between these) of the MCR is only partly guided by the region. The particular nature of SEZ of Shenzhen and Zhuhai, linked to the privileged relations with the Special Administrative Zones of Hong-Kong and Macao, which have been integrated back to the PRC only at the end of the last millenium and keep a certain level of independence in terms of governance, complicates even more the relations between actors within the region. The issue of a correspondence between some levels of



governance and urban processes is a tricky one: Liao and Gaudin (2017) interpret the progressive transfers of economic initiatives from the central power to local authorities as a form of a multi-level governance.

The complexity of these contexts is implicitly crucial in the analyses we will develop in the following: a given network development is generally the outcome of several processes at different scales. A positive accessibility impact at a given scale can have different roles at other scales, and a change in accessibility landscape can be provisory detrimental to ensure a longer-term overall improvement. Therefore, the quantitative analysis of accessibility landscapes we develop in the next section will make more sense when put in context of the fieldwork observations described in the last section.

2. Evolution of accessibility landscapes

2.1 Data and methods

We propose a simple but multi-scalar and multi-modal illustration of the evolution of accessibility landscapes following major infrastructural change in China. To have a generic measure we consider a temporal potential relative accessibility to populations, defined for a set of geographical objects (that can be for example cities or zones) with populations, given a travel time distance matrix (t_{ij}) between these areas, and a decay parameter "t_0" capturing the typical time span of travels, by

$$Z_i = \frac{1}{\sum_j P_j} \sum_j P_j e\left(\frac{-t_{ij}}{t_0}\right)$$

This object-level measure of accessibility to other populations can then be summarized for example using an average, but also hierarchy measure such as a rank-size exponent, expressing a level of inequality between areas in terms of accessibility.

We use only populations as territorial data, to ensure a certain genericity at different scales and on different geographical area. At the mesoscopic scale, we use the gridded population dataset at a 1km resolution in 2010 provided by Fu et al. (2014). At the macroscopic scale, we use the ChinaCities database, introduced by Swerts (2013) and provided by Swerts (2017). This database has the advantage of ensuring ontologically consistent definitions of cities (in the sense of variable city boundaries capturing evolving urban entities, in this case in the sense of a morphological continuity). Transportation network data are detailed for each case study below. Analyses are done in R, which is relatively flexible to handle GIS data, using a dedicated package for transportation network and accessibility analyses (Raimbault, 2018c). All source code and data (excluding population data which are openly available from original sources) are openly available on the repository of the project at <https://github.com/JusteRaimbault/ChinaAccessibility>.



2.2 Road accessibility in Pearl River Delta

2.2.1 Context of Pearl River Delta

The first analysis we present enters the specific geographical context of Pearl River Delta (PRD), which is one of the classical illustrations of the structure of a strongly polycentric MCR. We first describe the historical and geographical context of this region. Historically initially only composed by Guangzhou, the development of Hong-Kong and the establishment of Special Economic Zones (SEZ) in the context of opening policies by Deng Xiaoping, lead to an extremely rapid development of Shenzhen, and in a less proportion of Zhuhai. Shenzhen and Zhuhai were among the first Special Economic Zones, created in 1979 to attract foreign investments in these areas with flexible economic rules. The development model of Zhuhai was different of Shenzhen, since heavy industry was forbidden in Zhuhai. Guangdong province in which PRD is fully located has currently the highest regional GDP within China, and the MCR contains a population of around 60 million (estimations strongly fluctuate depending on the definition of the MCR which is taken, and the inclusion of the floating population). The phenomenon of migrations from rural areas is highly present in the region and a city such as Dongguan has for example based its economy on factories employing these migrant workers.

In the frame of transportation within the Pearl River Delta, there is no specific authority at this scale for the organization of transportation (but indeed entities at the level of the State, of the province and of municipalities), and each municipality manages independently the local network, whereas the connections between cities are ensured by the national train network. This leads to particular situations in which some areas have a very low accessibility, with a very strong heterogeneity locally. A good illustration of such a situation is given by the southern part of the city of Guangzhou constituting a direct access to the sea. This area has been recently directly connected with a metro line to the center of Guangzhou, whereas a direct link to the center of Zhongshan which is geographically closer is difficult to imagine. A similar situation can be observed at the terminus of line 11 in Shenzhen, for the neighbor district of Dongguan, the latest having a very low accessibility by public transport (see the map in Fig. 1 for locations, the map giving also the accessibility with the road network). This situation is however transitory, given the infrastructures already being built and the ones planned on a longer term: the Shenzhen metro, which covers today 285 km, is planned to reach 30 lines and a length of around 1100 km. This implies for Shenzhen a very high future transport density, corresponding to high urban density areas, such that the plan anticipates 70% of commuting by metro at the horizon 2030, as declared by the official plan of the city (Shenzhen Planning Bureau, 2016). It is clear that these developments mostly follow an existing urban development, a crucial issue is the voluntarism and the capacity to contain urban sprawl and to structure future developments around this new network, in the spirit of a voluntary integration between urba-



nism and transportation of the type Transit Oriented Development. Different final stations will be connected to the Dongguan metro, and new intercity lines will structure the longer range mobility, what will make the Delta a relatively well integrated in terms of public transport in a rather short temporal horizon. To have an idea of the development of the network in the coming years, the Table 1 gives the size of the planed networks in the different cities for 2030.

Table 1

Public transportation in Pearl River Delta. We give populations in 2010 taken from Network lengths are taken from the different planning documents for the Guangzhou metro, the Shenzhen metro and the Dongguan metro, and for the Zhuhai tramway. Zhongshan is not included since it exploits a BRT system but no heavy infrastructure.

CITY	POPULATION	NETWORK 2016	NETWORK 2030
Guangzhou - Foshan	18.9 Mio	390 km	800 km
Shenzhen	10.4 Mio	286 km	1124 km
Dongguan	8.2 Mio	38 km	195 km
Zhuhai (Tramway)	1.6 Mio	10 km	173 km

2.2.2 Impact of the Zhuhai-Hong-Kong-Macao bridge

A major transportation infrastructure project in the region is the bridge-tunnel closing the mouth of the Delta, linking Zhuhai and Macao to Hong-Kong (HZMB). The length of the crossing is 36.5 km, what makes it an exceptional infrastructure (Hussain et al., 2011). The opening to traffic was delayed by several years and was finally achieved in October 2018 (see the official website at <http://www.hzmb.org/cn/default.asp>). Zhou (2016) shows that the expected changes in accessibility patterns for the West of the Delta are relatively strong, and these can potentially induce strong bifurcations in the trajectories of cities. The necessity of the project is advocated by the different stakeholders of the project (Guangdong province, Hong-Kong Special Administrative Region, Macao Special Administrative Region) using an argumentation of a strong economic benefit in the frame of opening policies, and also through a social benefit for the West in particular. For example, Zhuhai is positioned as a new pivot between Hong-Kong and the West. The balancing of accessibility, in the sense of a diminution of spatial accessibility inequalities, operates however only for the private car transportation mode, what conducts to question its potential impacts: on the one hand the access to automotive remains reserved to a part of the population only, on the other hand the negative impacts of congestion can rapidly moderate the accessibility gains. These accessibility gains are mapped following the method described above, and shown with accessibility Z_i itself in Fig. 1. We used here the freeway network within the region in 2017, and added the bridge link. We observe that although population accessibility remains the lowest in Zhuhai compared to Guangzhou and Shenzhen, it is where the relative gains are the highest and the bridge operates a significant spatial rebalancing.



2.3 Public transportation accessibility in main cities

We now consider the evolution of urban rail transit accessibility in larger cities, considering currently existing networks, lines in constructions and planned lines. As 39 cities have existing, in construction, or approved metro networks, we consider the largest systems in terms of ridership with an annual ridership in 2017 larger than 600 million passengers. This correspond to 9 cities (Beijing, Shanghai, Nanjing, Guangzhou-Foshan, Shenzhen, Wuhan, Xian, Chengdu, Chongqing) which we define here as their metropolitan areas. The metro networks are vectorized from city maps (OpenStreetMap and Baidu Ditu) and opening years are taken into account, using history of metro systems from wikipedia Dates up to 2022 correspond to lines already in construction (included in Baidu Ditu), whereas different planning documents are included for lines planned later (to validate or invalidate the wikipedia information which is in some cases outdated; furthermore lines for which no explicit plan in terms of corridor or date is given are not included to avoid too much uncertainty). We consider here population accessibility at the 1km patch level. Only the metro network (average speed of 50 km/h) is considered and connectors (speed of 10 km/h) are used to connect each patch to the nearest station.

We show in Fig. 2 values of average relative accessibilities for each city, for different values of the decay parameter $t_0 \in \{30, 60, 120\}$ minutes (this parameter occurring in the formal definition of accessibility corresponds to the travel time considered for the accessible opportunities: the values taken here correspond to typical travel times in a metropolitan area). It is important to note that most areas have already reached a “mature” state, in terms of the potential accessibility gains for the baseline population. As we do not use projected populations and that population growth will most probably occur around tran-

Figure 1

Accessibility gain induced by the HZMB in Pearl River Delta, for the territory of mainland China. (Left) Accessibility to population Z_i ; (Right) Normalized accessibility gains. The population of Hong-Kong is taken into account in destination points although it is not included in origin patches. The highway network (2017) is mapped in blue and the new link of the bridge in purple. The level of color gives on the left a relative proportion of population in the delta accessible by car in one hour. On the right, the level of color gives the normalized gain of this accessibility due to the bridge. Significant accessibility gains therefore only occur in Zhuhai when Hong-Kong is not taken into account.



sit stations (at least in several districts where TOD policies are implemented), the gains we estimate are underestimated, and can reasonably be interpreted as a lower bound for the relative accessibility. Regarding the evolution of hierarchies, given here by α if $\log Z_i = \beta - \alpha \log r_i$ with r_i ranks in decreasing order, we observe in Fig. 3 on the long term a significant decrease in accessibility inequalities, for all cities and all decays. On shorter time spans, some cities such as Guangzhou or Shanghai present a provisory increase in the hierarchy of the distribution of accessibility given by this rank-size parameter α , corresponding to situations where the opened line connect more populated areas, but with a large number of areas with a low accessibility. Most cities have a decreasing hierarchy for all decays, at the exception of Nanjing for which the differential are rather low, and for which there is even an increase for the longest travel time, suggesting a different metropolitan structure.

Although this analysis remains limited for several reasons (including the absence of congestion, fixed population, and accessibility to population only), it however shows that these large metropolitan areas have already highly efficient networks and that accessibility inequalities have mostly significantly decreased thanks to the development of these metro network.

Figure 2

Evolution of the average urban rail transit accessibility for main Chinese cities. For the 9 studied areas, we plot as a function of year the average population accessibility with the 2010 patch-level population, for different values of the time decay parameter. As accessibilities are normalized by total population, they have no unit and correspond to a proportion of population reachable in a time given by the decay parameter. The different color correspond to the different values of this parameter in minutes.



Figure 3

Evolution of the hierarchy of urban rail transit accessibility for main Chinese cities. We plot the rank-size coefficient for accessibilities with the same settings as in Fig. 2. We recall that the hierarchy is given by the rank-size exponent of the distribution of accessibilities, and expresses in that way some kind of inequality of the distribution.

2.4 City-level accessibilities with the rise of High Speed Rail

Finally, we study the population accessibility at a national level considering the construction of the High Speed Rail (HSR) network. Since 2008, the People's Republic of China has established from scratch the largest HSR system in the world, witnessing a strong policy for territorial development, sustainability and territorial equity. With this regard, HSR is an important component of the new doctrine of the State Party ("Socialism with Chinese Characteristics"), recalling the importance of governance structures in the evolution of such infrastructure networks.

We vectorized the HSR network (existing and in construction, from Baidu Ditu and OpenStreetMap) to obtain a dynamic network spanning between 2008 and 2021. We couple it with the ChinaCities database (Swerts, 2017), considering cities of more than 500,000 inhabitants in 2010. We use only one date if the database as the latest available are 2000 and 2010. To obtain reasonable accessibility landscape, we abstract the traditional railway network with a full network between all considered cities with a speed of 100km/h, and overlay the growing HSR network with real speeds (ranging between 200km/h and 350km/h).

We show the temporal evolution of accessibility measures in Fig. 4, which have been computed for typical travel time at the national scale (6, 12 and 24 hours). We observe for all decays a decreasing trend of the hierarchy over the all period, confirming that accessibility rebalancing is efficiently achieved by the



HSR network. However, this decrease is not immediate and a significant peak, especially for the lowest travel time, appears in 2011 and 2012. This correspond to the dates when the Beijing-Shanghai line (2011) and the Beijing-Guangzhou line were fully open. At that time, as these large cities are far, the high decrease in travel time lead to a high increase of accessibility for these larger cities, whereas other territories were left behind. Later, with the maturation of the network, accessibility inequalities were eventually reduced. This dynamic has implications for the choices to be made when developing a new network, showing that the longer-term goal must be kept in mind when judging the investment choices and that middle-term gains for larger cities can be compatible with long-term territorial equity, contradicting the critics on high speed lines connecting large cities and neglecting forgotten territories. Regarding average accessibility gains, the construction of the full network correspond to a significant increase for all decays, and in 2018 most of the gains have already been attained.

Figure 4

Evolution of summary measures of city-level accessibility following the development of the high-speed rail network. (Left) Hierarchy of the distribution of accessibility, given by the rank-size exponent, for different values of the time decay; (Right) Corresponding average value of accessibility, with standard deviation of the distribution over cities as error bars.

We have shown with different case studies, for different transportation modes and at different scales, what are the dynamics of accessibility landscapes associating to the growth of transportation infrastructure networks, and how Chinese planning has achieved accessibility gains and balancing without precedent (given e.g. the length and extent of the HSR, but also the speed of construction of the metro networks) at different scales. This quantitative knowledge can furthermore be illustrated with concrete situations in practice, that we detail in the next section.

3. Qualitative fieldwork observations

This section proposes to illustrate the issue of interactions between transportation networks and territories, and more particularly issues related to accessibility. To do that, we show a diversity of possible situations that can be perceived in a qualitative way at the microscopic scale, through concrete fieldwork examples. The geographical subject is mostly Pearl River Delta, in Guangdong province, that we already described before, and more particularly mostly



the city of Zhuhai. The objective is to enrich the previous analysis with concrete situations and observations.

We assume the term of *Geographical Fieldwork*, with all knowledge of epistemological debates its use can raise. Indeed, we extract observations from places that were experimented, in the context of a given problematic (Retaillé, 2010). Our approach will also highlight the role of representations, underlined as a type of fieldwork in itself by Lefort (2012), when we will give a subjective view.

We recall that Zhuhai was chosen as a case study in the frame of the Medium project, and is therefore privileged in the fieldwork observations here. When the source is not explicitly given, observations come from fieldwork, for which detailed narrative reports and photographs are available on the open repository of this work at <https://github.com/JusteRaimbault/CityNetwork/tree/master/Data/Fieldwork>.

The format of narrative reports is “on-the-fly” following the recommendations of Goffman (1989) for taking notes in an immersive fieldwork in particular, whereas the voluntary subjective position (mostly in the detailed interviews described by Raimbault (2018a)) follows Ball (1990) which recalls the importance of reflexivity in order to draw rigorous conclusions from qualitative fieldwork observations of which the researcher is a part in itself. The consideration of the researcher as a *subject* in relation with its object of study does not imply in our case a feedback of the researcher on the system because of its size in the case of a transportation network at the scale of the city, and indeed a conditioning of observations by a subjectivity of which we must detach in the posterior exploitation of the observation material, but which ignoring can only increase the biases.

3.1 Development of a transportation network

The objective of fieldwork is thus to observe the multiple facets and layers of a complex public transport system which is always transforming, its links with observable urban operations, and to what extent these witness of interaction processes between networks and territories. The spatial extent of observations spans on Zhuhai as an illustration of local transportation but also punctually on other regions in China. These observations have their proper logic in comparison to the modeling of transportation networks or data analysis, such as accessibility studies or interaction models between land-use and transportation, that will be done in the following. Indeed, these fail generally in capturing aspects at a large scale, which are often directly linked to the user, and which can become crucial regarding the effective use of the network. For example, multi-modality is profoundly transformed by the use of the network. Multi-modality consists in the combination of different transportation modes: road, train, metropolitan, tramway, bus, peaceful modes, etc., in a mobility pattern. A multimodal transportation system consists in the superposition of modal layers, and these can be more or less well articulated for the production of optimal routes following multiple objectives (cost, time, generalized cost, comfort, etc.) which themsel-



ves depend on the user, and of the mobility pattern. It can in practice made efficient through the emergence of self-organized informal transportation modes, or the establishment of new modes such as bike-sharing, what solves the “last-mile problem” (Liu et al., 2012), which seems to be often neglected in the planning of newly developed areas in China. On the contrary, practical details such as tickets reservation or check-in delays at boarding can considerably influence use patterns.

Several trips on the Chinese territory were made to observe the concrete manifestations of the high speed network development. Since its inception in 2008, the Chinese HSR network has a great success and lines are currently saturated. It answers primary demand patterns in terms of city size, showing that it was planned such that the network answers to territorial dynamics. Its high usage shows the impact of network on mobility, what is a possible precursor of territorial mutations.

To show to what extent territories can influence the development of network in diverse ways, we can take a particular example, linked to the development of tourism, which corresponds to a particular dimension taken into account in planning. Thus, the line between Guangzhou and Guiyang (North-West axis which is precursor of the future direct link Guangzhou-Chengdu) have witnessed the opening of stations specifically for the development of tourism, such as Yangshuo in Guangxi, which number of visits has then strongly increased. One year after the opening of the station, the main road link with the city is still under construction, showing that the different networks react differently to constraints at different levels. A higher number of trains stops on week-ends - more than one each hour, are are full more than two weeks in advance. New mobility patterns can be induced by this new offer, as illustrate the interview of an inhabitant of Guangzhou done in Yangshuo, which came for a short week-end with her colleagues, in the context of a “team-building” trip financed by her startup in information technology. These new mobility practices are shown in a second interview of an inhabitant of Beijing met at Emeishan, sent by her company in Industrial Design for a short stay in Chengdu for a training in a local subsidiary. The company prefers the high speed train, and it recently increased the mobility practices for its employees.

A similar strategy can be observed concerning the connection of touristic destinations for the line Chengdu-Emeishan. The principal objective of this line is for now to serve the highly frequented touristic destinations of Emeishan and Leshan. However, the missing link between Leshan and Guiyang is already well advanced in its construction and will complete the direct link between Guangzhou and Chengdu. This reveals diachronic and complementary dynamics of network development following properties of territories. This line is a part of the structuring skeleton of the “8+8” recently reformulated by the central government, which corresponds to the general plan for future high speed lines, recently actualized to include 8 North-South parallels and 8 East-West others, completing the 4+4 already realized. The traversed territories expect a lot from it as show Lu et al. (2012) for the city of Yibin halfway between Chengdu and

Figure 5-6

Local manifestations of the mutations induced by the new high speed network. (Fig. 5) High speed station of Tangjia, in Zhuhai city. The monumental advertisement for a real estate operation praises the merits of the proximity to the network, which is also used as an argument for higher prices; (Fig. 6) High speed line in Zhuhai, deserted bus stop and real estate project being realized in a difficultly accessible area: this urban fringe is in direct contact with the rural environment on the other side of the line, and eccentric from the city. (Source: author).



Guiyang.

We also observe joint mutations of the railway network and of the city. We illustrate thus in Fig. 5 the insertion of the HSR in its territories. Direct effects of the network are linked to the development of totally new districts in the neighborhood of new stations, sometimes in an approach of type “*Transit Oriented Development*” (TOD, which as we recall is a planning paradigm which aims at articulating the development of an heavy transportation infrastructure with urbanization, typically through a densification around stations). Furthermore, more subtle indirect effects are suggested by clues such as the promotion of operations through advertisement. It shows the socio-economic expectations regarding the network and the local agents which have to contribute to its success: advertisements claiming the merits of high speed, and the selling of appartements in the associated real estate operations. This dynamic seems to contribute to the construction of a “middle class” and of the role it has to play in the dynamism of territories (Rocca, 2008), construction which is as much concrete since it depends on objective realities, as imaginary in the academic and political discourse, which construct the object simultaneously to its study or use. The insertion of lines in territories seems in some cases to be forced, as shows the Yangshuo station which exploits the tourism opportunity offered by the passage of the line in a low populated area but which is very attractive by its landscapes, or the new real estate operations in Zhuhai which are not very accessible because of their price.

Finally, it is important to remark that the network development answers simultaneously to different types of territorial contexts. Branches of the new high speed network with a short range, such as the line Guangzhou-Zhuhai, can be seen as being at the intermediary between a long range service and a proximity regional transport, depending on the modularity of serving patterns. This line is thus placed within long range urban interactions (the service Zhuhai-Guiyang being for example ensured) and within interactions in the mega-city region, most of the service being trains to Guangzhou. To this can be added the classical train network which keeps a certain role in territorial interactions: some connections require the use of both networks and of urban transportation, such as the link between Zhuhai and Hong-Kong, experimented through terrestrial transportation modes only. Indeed, following the Hato Typhoon on 23/08/2017, maritime links with the center of Hong-Kong and the international airport has been interrupted for a significant part of the delta, and has been reopened for Zhuhai in the beginning of November 2017 only, inspiring a fieldwork trip using terrestrial public transportation.

3.2 Implementing TOD: contrasted illustrations

The simultaneous development of the transportation network and the urban environment can be directly observed on the field. The local urban network and real estate development operations are planned closely with the new train network: the Zhuhai tramway, for which a single line is open at the current time and still being tested, is thought to participate in a TOD approach

Figure 7-8

Local manifestations of the mutations induced by the new high speed network. (Fig. 7) Yangshuo station on the Guangzhou-Guiyang line, which principal function is the development of this touristic destination which bases most of its economy on that field; (Fig. 8) Advertisement for high speed in Sichuan, at the station of the international Chengdu airport on the line to Leshan and Emeishan. The train departs from the futurist city to fly over the countryside, recalling the tunnel effect of territories telescoped by high speed.

(Source: author).



(see e.g. preliminary works of planning consulting, such as for example <https://wenku.baidu.com/view/b1526461ff00bed5b8f31d01.html> for the context of the new Xiaozhen district, in the West of Xiangzhou) to urban development which aims at favoring the use of public transportation and a city with less cars, such as wanted for example by the Planning Committee of the *High-Tech Zone* in charge of the development around Zhuhai North station. The observation of the surroundings of Tangjia station, also built in the same spirit, reveals a certain atmosphere of desertion and an unpractical organisation can lead to questioning the efficacy of the approach. This also suggests a certain self-fulfilling nature of the project, as suggested by advertisements for new real estate for sale, insisting on the importance of the presence of the railway line. A full narrative encouraging local actors and individuals to be involved around TOD seems to be used by different actors of development.

Other fieldwork observations, such as in the *New Territories* in Hong-Kong, witness of an efficient TOD which fulfils its objective, with a complementarity between heavy rail and local light tramway, and also a high urban density around stations. These observations recall the complexity of urban trajectories coupled to the development of the network, and that we must remain cautious before drawing any general conclusion from particular cases. We summarize in Fig.6 the comparison between the two TOD cases detailed above, as synthetic schemes of urban structures of each area. In Hong-Kong, urban areas have been conjointly planned with the MTR line (heavy transport) and the multiple light tramway lines (Hui and Lam, 2005). The infrastructure of light rail and the organisation of missions allow to rapidly connect with the closest station, distributing a highly uniform accessibility for all districts of the territory. On the contrary in Zhuhai, the village of Tangjia is old, even anterior to the rest of Zhuhai, and has developed without any particular articulation with transportation infrastructures. The location of the tramway, which just opened, completes the trajectory of the new railway line, with an objective of reorganizing the North of Zhuhai, and in particular the High-tech Zone which extends from the North railway station (Zhuhai Bei) to Tangjia. Currently, the urban organisation is strongly imprinted with this unsynchronized development, since public transportation accessibility is still relatively low, bus lines being subject to an increasing congestion due to the strong increase in the number of cars. Furthermore, the exploitation of the tramway has been difficult, since the technology used with a third rail in the ground has been imported from Europe and had never been tested in such humidity conditions (personal communication with Yinghao Li, July 2017), what lead to a questioning of the network plan in its entirety.

This fieldwork observations thus shows us that (i) under the same designation very different processes exist, and are extremely dependant to geographical, political and economical particularities; and that (ii) the development of a territory which is functional in terms of accessibility necessitates a fine articulation which seems to be the outcome of an integrated planning approach on the long time. In practice, such refined qualitative studies are necessary to comple-



ment the territorial diagnosis obtained with quantitative accessibility measures.

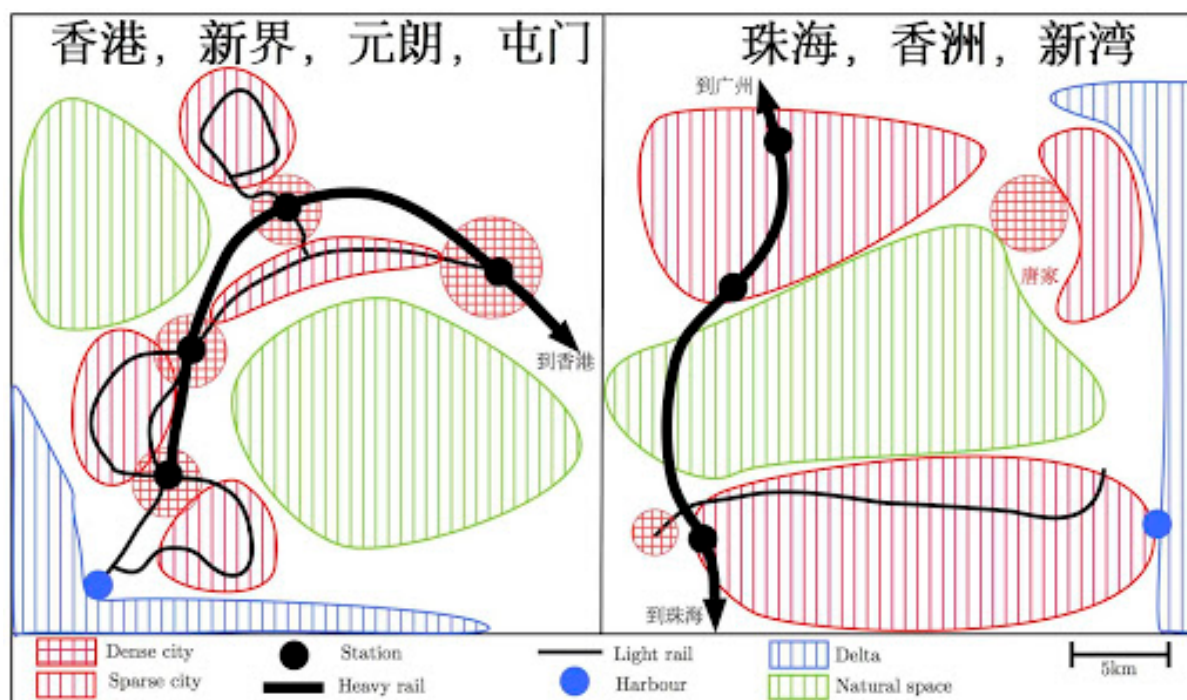


Figure 9

Comparative analysis of two implementations of TOD in PRD. At a comparable scale, we synthesize the urban configuration of Yuenlong and Tuenmun, Hong-Kong New Territories, on the left, and of Xinwan, Xiangzhou, Zhuhai on the right, which contains the Zhuhai High-tech zone in its Northern part in particular. The configurations illustrate different dynamics of articulation, and shifted construction temporalities, unveiling thus different realities under the notion of TOD. A first interpretation would be that it is effective if the trajectory of the full territorial system (urban development and transportation network) is modified early in its genesis, whereas a system with a higher level of maturity will have more inertia.

4. Discussion

4.1 Long-term impacts of accessibility mutation

The issue of long-term impacts of the evolution of accessibility landscape is at the core of the open question of interaction between networks and territories (Raimbault, 2018a). Empirically, there does not seem to a general consensus on systematic effects, illustrating the problem of potential structuring effects of transportation infrastructures (Bonnafous and Plassard, 1974). For example, in the case of France, Raimbault (2017) identifies causal relationships between future network accessibility anticipation and socio-economic dynamics, whereas Raimbault (2018b) finds no relation between rail network growth on the long time.

In our study here for example, taking the Hong-Kong-Zhuhai-Macao bridge, the medium and long term impacts of this infrastructure are indeed difficult to estimate. In terms of short-term impact, Wu et al. (2012) find patterns similar to the ones we estimate, i.e. a significant benefit for Zhuhai (and Hong-Kong that we did not take into account), and also immediate effects of traffic modification and economic impacts due to the toll or the increase of tourism. They mostly postulate the position of Zhuhai-Macao as a new pivot in the region. Even if it can be directly verified in terms of centrality and accessibility, it is not evident that this new position will influence particularly the

socio-economic trajectory of Zhuhai. An increased particular political accompaniment implying an increased collaboration between Hong-Kong, Zhuhai and Macao will be important (Zhou, 2016). Immediate economic effects are expected, as an increase of Zhuhai residents working in Hong-Kong (Zhuhai inhabitants are the only ones in the region to benefit of a special card allowing them to regularly visit the Special Administrative Areas (source: fieldwork on 06/11/2016 with Cinzia Losavio), but cases showing the contrary, such as investments from Hong-Kong towards the West of the Delta, have no reason to be systematic: the first case extends the already existing dynamic with Macao, the second is mostly to be constructed.

4.2 Possible trajectories of the coupled network-territory system

Generally, coupled trajectories for networks and territories can for the reasons above only be hypothesized. The use of simulation models is then an option to explore possible scenarios. A direction of exploration through modeling consists in considering the problem differently and to try to understand the dynamics of the metropolitan system in an integrated way, i.e. as a territorial system in our sense, in which the strong coupling between territory and network is operated through a proper ontology for governance entities. This approach was for example developed as a preliminary study by Le Néchet and Raimbault (2015).

At this stage, several assumptions for the future trajectory can be proposed: (i) in the worst case, networks do not respond well to the actual demand patterns, and territories do not particularly benefit from accessibility gains (this does not seem however to be the case as show the high use patterns of HSR and metro networks for example); (ii) accessibility gains are beneficial to territorial activities, but do not induce particular territorial bifurcations; (iii) the voluntary planning policy are actually effective, and significant mutations for some districts and cities are observed, together with significant modal shifts, enhancing an environmental and economic improvement. Given that such network developments in such a short time are without precedent, impacts may be significant and the last scenario seems to be plausible.

4.3 Transferability of models

We have studied here different cases of territorial development and infrastructure projects. The possibility of transfer of urban models (such as TOD), in the sense of the applicability of generic frameworks to different geographical contexts, is generally difficult. The synthesis of empirical conclusions obtained from very diverse case studies is also difficult. The East-Asian particularity has already been shown for the economic structure, and how it can not be interpreted in a simple way by a separation of microscopic and macroscopic processes as some quick and ideologically oriented readings may have done, such as the approach of the World Bank (Amsden, 1994). The comparability of urban systems is an open question at the core of issues for the Evolutive Urban Theory (Pumain et al., 2015). It is linked to the ergodic character of these systems:



the ergodicity assumption postulates that the trajectory of a city in time captures the set of possible urban states, and also that different cities are different manifestations of the same stochastic process at different periods. In that case, an ensemble of cities would allow to understand their temporal trajectories. It is intuitively not the case, and urban systems would rather be non-ergodic (Pumain, 2012). Thus we will have to remain cautious for the generalization of conclusions.

5. Conclusion

We have illustrated in this chapter how the deep mutations of transportation infrastructure networks can modify the accessibility landscapes, in the case of recent Chinese dynamics at different scales. We show that geographical balancing of accessibility is achieved and that highly accessible territories are produced. These mutations can be observed both from a quantitative and qualitative viewpoints, the second giving naturally more contrasted and specific conclusions. This suggests however models for sustainable transitions that most of territorial systems across the world still need to achieve.

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Chapter 8. Building wealth through a stratified inclusion: the point-based hukou system in Zhuhai

Cinzia Losavio

Abstract

In the last decade, forced to promote the social inclusion of a soaring number of migrants in cities, the Chinese central government has issued a number of measures to ease the delivery of urban *hukou*, to award subsidies for social housing, and to facilitate access to education and to social security. However, on the city level, internal migrants' integration policies are strictly intertwined with the developmentalist aspirations of local governments. The size of cities, their economic weight as well as their growth pattern have acquired special significance in their relation to social policies and population management. The point-based system is the new framework regulating urbanization patterns, controlling social benefits allocation and granting full urban membership.

Outlining the main *hukou* policies in Zhuhai, a typical third-tier city located in the Pearl River Delta, and observing their implementation, this paper explores how the point-based system has contributed to the deconstruction of the internal migrants' category, promoting a stratified and selective integration model. While handpicking the youngest, the best educated and the most qualified migrants as valuable resources for local development, the new pattern generates a highly competitive system for the “*liudong renkou*”, increasing the socio-spatial differentiation of urban space.

Keywords: Internal migrants; point-based hukou system; social inclusion.

1. Introduction

Over the past few years, rural to urban migration and integration patterns have intersected with two developments in China's current context: first, the increasing pressure on China's largest megalopolis resources due to the ever more noticeable and lasting presence of Chinese migrant-workers in urban areas; and second, the recent shift from an export-driven economy to one powered by domestic consumption to ensure a constant economic growth. These two evolving trends contributed in the last ten years in the shaping of a new urbanization scenario, which has called for the integration of a large

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Figure 1

A municipal billboard picturing Zhuhai's coastline. The characters say: “We can build together Zhuhai's quality”. Gangwan Avenue, Zhuhai. November, 2016. (Source: author).



number of internal migrants in cities of smaller size.

Note 1

In 1979 Deng Xiaoping launched the “reform and opening-up” (改革开放, *gǎigé kāifàng*) policy aiming to promote China’s modernization by shifting from a centrally planned economy to a market economy, and by opening its doors to foreign investment.

Note 2

For more detail see: Chan K.W., Zhang L., 1999, The Hukou System and Rural-Urban Migration in China: Processes and Changes, *The China Quarterly*, 160, 818-855.

In China, urban development and internal migrations go hand in hand with economic transformation. Since the early 1980s¹, as a series of reforms have been launched to increase labour mobility in line with economic development, and as the population distribution of the country was being reshaped to enhance urban growth, the Chinese urbanization strategies have been dominated by a gradual and balanced approach. A large urban–rural economic gap needed to be addressed by “*strictly controlling the development of large cities, rationally developing medium-sized cities and vigorously promoting the development of small cities and towns*” (Shen, Cui, 1990). Thereafter a “hierarchy of settlements” (Marton, 2013) was envisaged, and initially, the growth of the top of this pyramid was mainly encouraged. Large urban centres, treated as the nucleus (核心, *héxīn*) of the economic reforms, as well as the freshly established Special Economic Zones (SEZs), concentrated most industrial activities, and increasingly attracted rural workers. However, the population mobility generated by this spatial economic restructuring was not imagined to be *de jure* permanent. Specifically, rural to urban and intra-provincial migration didn’t imply a formal transfer of migrant workers’ local residency (non-*hukou* migration), consequently denying access to social welfare and other public benefits at the destination place. The household registration booklet (户口本, *hùkǒuběn*), modelled after the Soviet propiska (internal passport) and officially adopted in 1958, classifies all Chinese individuals according to their status (类别, *lèibié*) of “agricultural” (农业, *nóngyè*) and “non-agricultural” (非农业, *fēinóngyè*) and to the place of hukou registration (户口所在地, *hùkǒu suǒzàidì*)². To this day, the social benefits an individual is entitled to are related to these two markers and are tied up to his place of origin. A formal conversion of one’s hukou status or place of registration requires going through an administrative articulated process determined by a collection of changing criteria and quota. After the decentralisation of fiscal and administrative powers in 1994, this conversion process became more localized and the plethora of criteria and quota defining it, more dependent on local power and economic situation. The general rule is: fewer criteria and bigger quota at the bottom of the urban hierarchy, where social services are underdeveloped and job opportunities less attractive, and more entry barriers and limited quota at the top layers, offering higher wages and greater social benefits.

The opening-up reforms and the expansion of the mainly export-oriented industrial sector increased the need for a flexible *floating* population, though welfare remained spatially anchored. The result was the emergence in urban areas of a soaring number (from few million in the early 1980s to 287 million in 2017, NBSC) of non-*hukou* migrants, often referred to as a floating population (流动人口, *liúdòng rénkǒu*). Becoming the backbone of the exceptional economic growth the country experienced in the last 40 years, without benefiting from the State-provided resources, non-*hukou* migrants highly contribu-



ted to increasing the urban population rate from 26.4% in 1990 to 58.52% by the end of 2017 (NBSC)³. The growing migration phenomenon has been the engine of an “incomplete urbanization” (Chan, 2010), whose main characteristic is to exploit internal workforce minimizing the State expenses.

In the last 15 years⁴, following the soaring presence of non-*hukou* migrants in the urban space, there have been many official attempts from the central government to ease their integration in their place of arrival. The central state policies have intended to remove the distinction between urban and rural status (Chan, Buckingham, 2008), have expanded public services such as employment information services, vocational schools and legal aid to migrant workers (Ngok, 2012) and have opened the possibility for them to access some social services, such as health care, housing and education for their children, through the market. More recently, in line with the intention to reorient economic growth through domestic consumption, the State Council has announced a “new-type” of urbanization strategy⁵, which lies in the integration by 2020 of 100 million migrant workers by granting them urban *hukou* and by awarding subsidies for social housing.

However, even though the political power in China remains vertically structured, key measures are not directly enforceable by the centre, and they strongly depend on local governments. The “hierarchy of settlements” conceived in the early 1980s, has developed into a multitier urban system whose corresponding administrative and executive powers have significantly increased. The fiscal pressure and the huge amount of resources necessary to grant equal status to non-*hukou* migrants, coupled with the imperative of moving towards development⁶, have encouraged city level officials to find manifold ways to circumvent the central rhetoric, the last one being the adoption of a point-based system.

The point-based system is the new framework some major cities have recently adopted in order to regulate urbanization patterns, to control social benefits allocation and to grant full urban membership to newcomers.

Earlier research on migrant workers’ urban integration has highlighted the role of the household registration system (*hukou*) in generating a rural-urban dual discrimination system, which has impacted rural workers displaced in urban areas (Solinger, 1999; Chan, Buckingham, 2008). Nevertheless, since the easing of restrictions on a national level, little attention has been paid to the most recent alterations the *hukou* system has experienced at the local level. Although the weight of *hukou* status has apparently been shrinking, social welfare benefits continue to be associated to it and since the capacities of local governments for providing for those benefits remain limited, the *hukou* continues to be “traded at a high price”.

In a context of rapid urbanization and economic transformation, to what extent are migrant workers entitled to be part of urban integration in Zhuhai? In order to reply to this main research question we need to firstly investi-

Note 3

The percentage of people living in cities and having local *hukou* stood at 42.35% at the end of 2017. <http://finance.chinanews.com/cj/2018/02-28/8456338.shtml>

Note 4

“The year 2003 was the turning point of public services for migrant workers as the State Council, the central government authority in China, issued three important policy documents aimed to reduce discrimination against migrant workers in cities and to provide them with entitlements previously enjoyed only by urban residents. Since then, a number of more specific policies have been issued” (Ngok and Cheng, 2010).

Note 5

The new type urbanization strategy has firstly been announced in a proposal related to the 12th Five-Year plan for China’s economic and social development (2011-2015) issued by the Central Committee of The Chinese Communist Party on 16 March 2011. After several rounds of revisions, China’s New-type Urbanization Plan, 2016–2020 has been formalized in March 2014.

Note 6

Since the early 1980s, a Performance Evaluation system has been introduced as a mechanism to improve government functions and control all the layers of the Chinese administrative pyramid. The performance management system evaluates the local officials’ ability to maintain a stable and harmonious society as well as to promote economic and sustainable development. (Walker, Wu, 2010; Ye, Ni, 2016).



gate the nature and the scope of the newly implemented score-based *hukou* system. How does the new system work? Which are the criteria regulating the selection of migrants who can be granted with full urban membership? Is the point-based *hukou* system enabling different internal migrant groups to officially become urban residents, while developing the city in which they live and work? Outlining the main *hukou* policies in Zhuhai and referring to the highly representative case of a migrant workers' family which has been living in Zhuhai for 10 years, our paper shows that while handpicking the youngest, the best educated and the more qualified migrants as valuable resources for local development, the new points-based system generates a highly competitive system for the "floating population", increasing the socio-spatial differentiation of urban space.

Even though we decided to expose the story of one sole emblematic migrants' family, our research is based on more than 120 interviews with migrants living in Zhuhai and on a dozen interviews with local government officials made during 21 months of fieldwork from October 2016 to August 2018. The analysis of these interviews is supported by policy and regulations documents as well as by on-site observation. While most research on Chinese internal migrants focus on first- and second-tier cities, we chose Zhuhai, a typical third-tier city, as a case study for several reasons. Although the rhythm of Zhuhai's economic and spatial growth has been slower than Shenzhen and other municipalities of the Pearl River Delta (PRD) mega-city region, and its population inflow is more restrained, Zhuhai's central position in the PRD and its industry sector supported by the special economic policies has since August 1980 helped to attract thousands of rural-to-urban migrants. Furthermore, Zhuhai's recent innovation-led economic strategy sustained by the implementation of a new round of the population development plan should create new opportunities for migrants' integration. In the new phase of the Chinese urbanization, which is switching attention to cities of smaller size and to their increasingly diversified population, Zhuhai provides us with significant empirical contents on the current approach some local governments have been using to manage internal migrants' integration.

Figure 2

A group of migrant workers mostly from Hunan province, on a construction site in Zhuhai's High-Tech Zone. Jinding area, Zhuhai. October 2017. (Source: author).

Note 7

According to the 2015 national population census, Guangdong province had the largest floating population of the country (32 million), 91.94% of it being disseminated in the PRD (29.44 million, showing an increased of 2.53% compared to 2010 census).

Note 8

With the opening, in October 2018, of the Hong Kong-Zhuhai-Macao Bridge, the world's longest cross-sea span and the first of its kind in China, Zhuhai has become the only mainland city to directly connect Hong Kong and Macao by roadway.

2. *Hukou* reforms in Zhuhai: building wealth through a stratified inclusion

2.1 Building Zhuhai's economic wealth

Zhuhai is a prefecture level city located in the Western Pearl River Delta (PRD), which is one of the most attractive areas for Chinese migrant-workers⁷. Its strategic geographical location provides convenient linkages with the four key areas of the region: Guangzhou, Shenzhen, Macao and Hong Kong⁸. This was one of the reasons that made the central government designate Zhuhai, in August 1980 – along with Shenzhen, Shantou and Xiamen – as one of the first SEZs of the country, turning Zhuhai into one of the leading cities in spearhea-



ding the development of today's PRD "mega-city region" (Mu, Yeh, 2016).

Before 1979, when it administratively became a prefecture level city, Zhuhai was an underdeveloped rural county with a population of 360,000 (www.stats-zh.gov.cn). Soon after the opening up policy was adopted, in line with the national motto of "vigorously promoting the development of small towns and villages", and encouraged by special economic policies, the development of joint ventures and enterprises has been dramatically increased in Zhuhai⁹, impacting its population growth. At the end of 2017 its permanent population stood at 1.765 million (Zhuhai Statistical Yearbook, 2017), of which 1.3 million people were holding a local *hukou*. Despite its relatively small population compared to other cities of the PRD, in 2017 Zhuhai's GDP grew by 9.2% to 256.47 billion RMB (Zhuhai Statistical Yearbook, 2017) with the fastest growth-rate of the Guangdong province¹⁰. Its economic prosperity is also mirrored in the city's per capita GDP which amounted to 149,100 RMB Yuan¹¹ in 2017, standing higher than those of Beijing (129,992 Yuan) and Shanghai (124,536 Yuan) and ranking 3rd among Guangdong's cities.

The industry sector has been the largest contributor to Zhuhai's GDP generating added value of 110.56 billion RMB. During the first decade of the opening up reform, the majority of its economic activities were labour-intensive, small in scale and limited to light industries, textiles, electronics, and building materials, making Zhuhai rapidly attractive for peasant workers from neighbour provinces. Between 1979 and 2000, and especially after Deng Xiaoping 1992's southern tour (南巡, *nánxún*), the city's floating population increased at a relatively fast pace¹² rising from 0 to 497,523 people (www.stats-zh.gov.cn). However, unlike other cities of the PRD, such as Shenzhen and Dongguan¹³, where migrant population rate is higher than *hukou* population rate, Zhuhai's *liudong renkou* have increased in a more moderate rhythm (742,800 in 2017)¹⁴. That can partially be explained in terms of economic development patterns: if in Shenzhen, Dongguan and Guangzhou heavy industry was more encouraged, Zhuhai has shown a comparatively higher proportion of light industry to heavy industry, being more successful on developing its fishing and tourist industry.

Despite the official statistics on internal migration, which only take into account migrants who registered at the local police office (派出所, *pàichūsuǒ*) upon their arrival, neglecting an important part of them, the proportion of newcomers Zhuhai would officially integrate depended on the position the city was supposed to hold in the urban hierarchy we mentioned above. Setting up to be a fast-growing large city, Zhuhai needed internal migrants for the sake of economic development, but at the same time, had to strictly control the allocation of urban resources, especially when these resources became in 1994 responsibility of the local administration. The easing of government restrictions on population mobility didn't mean an easy access to urban *hukou* and all the benefits it conferred. The migrants' integration approach that Zhuhai's government has embraced since the '90s has been gradual, extremely selective and strongly dependent on the local economic needs of the moment. This appro-

Note 9

China Business: The Portable Encyclopedia for Doing Business with China (*World Trade Press Country Business Guides*, 1994, 194).

Note 10

See: Zhuhai GDP rebounds to lead province, 2016 (http://subsites.chinadaily.com.cn/zhuhai/2016-12/23/c_64517.htm); GDP ranking of Guangdong's cities in the first quarter of the year (2018) (广东省各城市一季度GDP排名 珠海增速领先), <http://zh.news.fang.com/open/28369227.html>.

Note 11

See: Zhuhai Statistical Yearbook 2017, Zhuhai Municipal Statistics Bureau and Zhuhai Economic Operation Bulletin 2017, GDP ranking of Zhuhai's districts and special economic areas (广东珠海·2017年珠海市经济运行简报·珠海各区GDP排名).

Note 12

Between 1990 and 2000 the annual average growth rate calculated on the floating population was of 13.7 per cent.

Note 13

At the end of 2017, in Shenzhen, out of a total population of 20 million, 3.67 million have an urban residency (户籍). Likewise, in Dongguan, out of a total population of 8.34 million, those having a local urban *hukou* amount to 2.11 million.

Note 14

Zhuhai Statistical Yearbook, 2017.



ach can be synthesized by the three main *hukou* policies the city has adopted successively from 1997 up to now: the apartment-*hukou* strategy, the investment-*hukou* policy, and the point-based *hukou* system.

2.2 Stratifying inclusion and deconstructing migrant workers' category: From the apartment-*hukou* strategy to the point-based *hukou* system

As early as 1997, with the “Regulations on the Management of *hukou* migration in Zhuhai” the city put in force the “apartment-*hukou* policy” (购房入户, *gòufáng rùhù*, literally “to buy an apartment to get a local *hukou*”). The policy opened the possibility to outsiders with a stable job and a permanent abode, to permanently transfer their own *hukou* – as well as that of their spouses and children – in Zhuhai, by purchasing an apartment of at least 75 square metres. Formally enforced to “help ensure the orderly management of internal migration” while facilitating the obtainment of local residency for the soaring number of migrants working in Zhuhai, the apartment strategy was indeed a way to activate the local real estate market. Only those migrants already economically integrated into the urban structure were allowed to trade local *hukou* for urban prosperity. In 2002, to further stimulate the local housing market, the policy was extended to “second-hand apartments” (二手购房入户, *èrshǒu gòufáng rùhù*, literally “to buy a second-hand apartment to get a local *hukou*”). The “*goufangrùhù*” reform marked the beginning of an administrative process aiming at deconstructing the migrant workers’ category into a pyramid where those standing on the top layers, thanks to their economic capital and their professional and personal qualification (素质, *sùzhì*)¹⁵, could easily slide to the urban side of the population, while the rest, the shapeless mass of “three-without” (三无, *sānwú*)¹⁶, could, informally, keep contributing to the urban construction, without placing too much of a burden on the city’s finance.

Note 15

The Chinese concept of “*suzhi* (素质)” describes a person’s qualities measured in terms of behaviour, education, ethics and ambition. Since high or low *suzhi* depends on one’s education and cultural level, farmers, peasants and manual labourers are generally considered as lacking *suzhi*. Furthermore, the Chinese government has in recent years undertaken a concerted effort to create a harmonious society (和谐社会) through *suzhi* building to enable social self-governance and to avoid the threats of civil unrest (Tomba, 2009).

Note 16

The Chinese expression “三无” (*sānwú*) translated as the “three-without” or the “three-nos” refers to those with no source of livelihood, no work ability and no legal support.

Note 17

Zhuhai *Hukou* Net, Zhuhai’s *hukou*-apartment policy: In 2008 Zhuhai’s *hukou*-apartment policy has been cancelled (珠海买房入户、珠海买房入户政策在2008年就已取消), <http://www.zhrh.org/index.asp?fff/1848.html>.

Note 18

珠海市人民政府令第60号, Zhuhai Municipal People’s Government Circular No. 60.

A few years after its enforcement, the apartment-*hukou* policy effectively boosted the local economy through property market, but population management problems concomitantly emerged. The fast-expanding population put huge fiscal pressure – in terms of public and social services expenditure –, on the local government, compelling the city administration to suspend the second-hand apartment regulation in 2005, and to put an end to the apartment-*hukou* strategy 3 years later¹⁷. The local authorities had “to strengthen the management on population mobility, and to optimize the demographic structure”, while “promoting economic development and improving the population quality” (提高人口素质, *tígāo rénkǒu sùzhì*)¹⁸, which meant to adopt a new, more stringent regulation to select the outsiders (外地人, *wàidìrén*) who could officially become local residents (本地人, *běndìrén*). In June 2008, the “Circular No. 60, Regulations on the Management of *hukou* migration in Zhuhai, 2008”, introduced the “investment-*hukou* policy” (投资入户, *tóuzī rùhù*, literally “investing to get a local *hukou*”). Eligibility criteria became much stricter and echoed the new economic ambition of Zhuhai: to become a key city



on the west bank of the PRD in terms of technological development and innovation. Under the new regulation, which put great emphasis on the innovation target, a new highly-qualified category of migrants could apply for *hukou* transfer in Zhuhai: young (under the age of 45) and educated (with above college degree) employees of private companies (production and Sci-Tech), who had already paid social security for 3 years. Even the companies whose employees wanted to have access to local residency had to comply with a number of specified criteria, related to their contribution to the economic development of the city in terms of taxation and investment (firms total investments must amount at least from 1 to 1.5 million RMB). In order to safeguard the financial interest of the municipality and to endorse its economic vision, the investment-*hukou* “integration” policy, added more restrictions and entry barriers for migrants at the lower layers of the pyramid instead of relaxing those already in force. In parallel, upper levels became even more stratified according to the degree of specialization migrants could offer to the city.

The investment-*hukou* strategy had, in only three years, successfully supported Zhuhai aspiration to become an international innovative city, on top of reducing the excessive financial burden on local administration caused by previously granting too many *hukou*. Between 2009 and 2011, Zhuhai was ranked among the top 50 innovative cities of the country (Fang, Ma, Wang, 2014). To enhance its economic and innovative performances, the local State was aware that the power of *hukou* in regulating urbanization patterns and controlling social benefits allocation was still effective. The *hukou* strategy should become even sharper in controlling the inflow of outstanding migrants (优秀农民工, *yōuxiù nóngmíngōng*)¹⁹ and in selecting the “talents” (人才) needed to sustain the persistent industrial upgrades. The foundations for the point-based *hukou* system were being laid.

2.3 The point-based *hukou* policy: stratifying migrants to integrate talents

In line with the above-mentioned objectives and in order to perfect the selection of non-local talents, on January 2011, Zhuhai adopted a new policy granting urban *hukou* in exchange for qualifications measured through a system of indicators and points (积分, *jīfēn*)²⁰. Following the pilot scheme launched in Shanghai in 2004²¹, and then in Zhongshan in 2009, the Guangdong government issued in June 2011 a policy guideline enforcing the point-based *hukou* system (积分入户, *jīfēn rùhù*) in the major city of the province²². The architecture of the new strategy leans on three-levels indicators and a fixed quota. The indicators are determined by the Development and Reform Bureau of each municipality in accordance with those transmitted by the provincial government and adjusted year by year according to the local developmental priorities (Article 5). The total number of points a migrant can accumulate results from the addition of three kinds of indicators:

Note 19

Zhuhai Municipal Public Security Bureau, 2008, Guidelines on how to handle the procedures to let outstanding migrant workers obtain a local *hukou* (优秀农民工入户城镇手续办事指南).

Note 20

Zhuhai Human Resources and Social Security Bureau, 2011, The rating scheme to qualify migrant workers for urban *hukou* in Zhuhai city, Guangdong (珠海市异地务工人员积分制入户评分表).

Note 21

The Shanghai pilot scheme was intended just for college graduates.

Note 22

See Zhang, 2013 and Guo, Liang 2017.



- First-level indicators that correspond to basic requirements, include age, status of health, labour contract status, participation in social security, family planning situation, housing condition and abidance by law. These basic requirements, which are compulsory to also earn points from all kind of secondary and tertiary indicators, set the general qualifications migrants must cumulate in order to take part in the selection process.
- Second-level indicators related to personal quality (素质), such as education, professional qualifications, honours and awards obtained in skills competitions;
- Third-level indicators that consist in bonus points can be earned according to one's personal and economic status (marital status, housing ownership, collective residence permit)²³, participation to social and voluntary service, voluntary participation in health and epidemic prevention programs and abidance of provincial family planning regulations.

Note 23

Migrants registering their residency at the address of the firm they work for.

The score system is tuned using an annual quota, which allows the control of the number of qualified people who can be legally admitted to join the urban population, in accordance to the annual available social resources and the economic targets to achieve. Based on the local annual quota, qualified applicants with the highest scores will be granted a local *hukou*. If the annual quota is exceeded, eligible applicants are then ranked to fill the quota vacancies.

In Zhuhai, the minimum score to apply for the new *hukou* transfer system is 80 points. However, men over 50 and women over 40 must also have contributed to the basic retirement insurance for urban workers for over 10 years. Younger people, the more efficient labour force, are favoured over older people, who tend to increase the fiscal burden of the city in exchange for lower productivity.

By creating a stunning, minutely detailed system of migrant workers' selection, Guangdong's provincial and local State have found a new way to bypass the central government's directions on easing *hukou* restrictions, while attracting the talented workforce needed for the new innovation-driven development strategy. Apparently more inclusive, the points-quota system stratifies even more deeply the internal migrants category while generating a highly competitive environment between them.

2.4 The hukou point-quota system in practice: the Fang's family²⁴ in Zhuhai

In order to illustrate the way in which the point-based *hukou* system operates, we will now explore the case of the Fangs, a migrant family from central China's Hunan province that we firstly met in Tangjia village (Zhuhai) in October 2016. The case of the Fang family, which is highly representative of internal migration trajectories in Zhuhai, will help us understand the selective and competitive character of the score-based *hukou* system.

Note 24

For privacy reasons all names have been changed.



Mr Fang, a 33 years old migrant worker, arrived in Zhuhai in march 2007, from a rural village under the jurisdiction of the prefecture-level city of Huaihua (Hunan). Upon his arrival he worked for 3 years in a electronic factory, before finding a job in a residential compound as a maintenance worker (物业管理) where he is still working. In 2008 he met his soon-to-be wife, Mrs Hu from the Guangxi province. When I met them in 2016, they had two children aged of 6 and 3 years. They all lived in Zhuhai, with Mr Fang's younger brother and his parents. In 2016, Mr Fang, who had a regular labour contract and had been contributing to 3 different social security programs for 8 years, had the basic requirements to send his application through the new local point-based system to try to obtain the local *hukou*. Although he didn't own an apartment, thanks to his young age and his educational attainment (has a secondary education certificate and a junior-level technician title, 初级技工) he achieved a total score of 119 points, meeting the minimum threshold of 80 points and making him eligible for Zhuhai's *hukou*.

In 2016, based on a floating population of around 510 000 people, Zhuhai's quota of available *hukou* for migrants was set to 3200. The local authorities received a total of 3595 applications, of which 3554 were reviewed. Even though the minimum score set to participate in the program was of 80 points, the lowest score for that year was of 125 points, showing a high degree of competitiveness among migrants. Mr Fang who was an eligible applicant, failed to obtain the local *hukou* in 2016, a result he had faced for two consecutive years.

In 2016, among the 3200 accepted applicants 68.9% had at least a junior college degree (+ 4.68 compared to the previous year), 30.3% were senior technicians (高级技工) (+ 1.59 compared to the previous year) and 90% ranged in age from 18 to 39 year old. Only 11 applicants had a score below 90 points²⁵. Those figures explain the way in which the new point-based policy handpicks the youngest, the best educated and the more qualified migrants as valuable resources for local development, while generating a highly competitive system for the “*liudong renkou*”.

Mr Fang continues to live and work in Zhuhai and plans to gain enough points to get a local *hukou* in the next few years, for example, as he suggested, by getting an award or an honorary title linked to his job performance (10-50 points) or by contributing to voluntary services (10-20 points). For now the only service he can benefit from the local government is a 9 year-period of free education for his children. The point-based *hukou* system is in fact connected to the point-based education system (积分入学, *jīfēn rùxué*). In Zhuhai the minimum score allowing migrants' children to enrol in local public schools changes according to the district or the special economic area where they live.

Zhuhai has three districts – Xiangzhou, Doumen and Jinwan – and five economic zones – Gaolan harbour industrial zone, Zhuhai hi-tech industrial development zone, Zhuhai free trade zone, Hengqin economic development zone, and Wanshan ocean development testing zone. In 2017 the minimum score to enrol in a primary school in Xiangzhou, the most developed and urbanized district of the city, was set to 118 points and to 81 points to enrol in the

Figure 3

Migrants' children waiting for their parents at the gate of a public primary school in Tangjia village. Tangjia Village, Zhuhai. November, 2016.

(Source: author).

Note 25

Zhuhai Human Resources and Social Security Bureau, 2016, List of workers who got Zhuhai's *hukou* in 2016 through the city migrant workers points system (2016年珠海市异地务工人员积分制入户人员名单).



junior middle school. The same scores are also applied to enrol in schools in the newly established high-tech zone (高新区, *Gāoxīnqū*), where Mr Fang is working and living with his family. Fang's total score of 119 points allow him to send both of his children to a public school. An old factory colleague of Fang, Mr Xiang, a Hubei province native, who has been living and working in Xian-gzhou district for 15 years, told me that he would like to have the same chance of enrolling his two children in a local public school in Zhuhai, but he didn't even try to apply to the score-base system because he doesn't have the basic requirements to do it. His children are therefore studying in their native town, in Hubei, where they live with Mr Xiang's parents.

In the other districts and economic zones of Zhuhai, which are less urbanized and located in more remote areas of the city, the threshold is set at a lower level (Doumen: 98 points for primary school and 50 points for junior middle schools; Jinwang: 74 and 46 points; Hengqin 60 and 42 points; and in Gaolan port economic zone: 40 points for primary school and no minimum score is set for junior high schools). For less qualified migrants, whose labour is still needed but whose qualifications and social capital is not sufficiently valuable, it is easier to settle – and send their children to school – in less developed and remote areas of the city, than in more central and equipped districts. Through the point-based education system, even migrant children's access to education is stratified. In other words, their chance to enrol in local public schools is defined according to the value of their parents' contributions to urban prosperity.

3. Conclusion

The analysis of *hukou* policies in Zhuhai from the opening up reform to the present day allows to study urban integration strategy from the State's point of view, in a country with one of the fastest urbanization pace and one of the most impressive internal mobility patterns. This analysis aims at better apprehending the strong link between urbanization dynamics, strongly sustained by internal migrations, and economic orientation, which appears to be increasingly developmentalist (Knight, 2014; Zhang, 2018). The point-based *hukou* policy adopted since 2011 by Guangdong's major cities, in line with the promotion of a long-term development strategy driven by scientific and technological innovation, stands as a highly selective and stratifying approach to secure the skilled workers needed to sustain this new model of economic growth. Our main research question, which intended to explore to what extent migrant workers are entitled to be part of urban integration in Zhuhai, in the new context of rapid urbanization and economic transformation, found an answer in this analysis.

The less qualified migrants, who keep contributing to the development of the city at the bottom of the pyramid, are allowed to be part of the urban workforce but are prevented from benefitting from urban social aid and full membership. They cannot even apply to the score-based system. Those with intermediate skills are given the opportunity to try to change their *hukou* status, but since the quota system limits the number of accepted applications,

Figure 4

A Chongqing native migrant worker who has been living in Zhuhai for more than twenty years. Tangjia Village, Zhuhai. September 2018. (Source: author).



they keep being disqualified for the transfer. To get more points they need more qualifications and better job performances. This “keep trying until you succeed” strategy, generates strong competition among migrants. Finally, on the top of the hierarchy, the youngest, and the most highly qualified and best-educated migrants, are the most welcomed to transfer their *hukou* in Zhuhai, where they can devote to the construction of urban wealth and simultaneously perfect the image of the city.

While offering an apparently greater leeway for migrants who want to officially settle down in sought-after cities, the newly implemented points-based *hukou* policy does contribute to stratify migrants’ category in a hierarchy of merit in order to integrate talents. Concomitantly, the points policy leads to an increased socio-spatial differentiation of the urban space, enabling the municipal governments’ interests to prevail over other social concerns.

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CROSS-CUTTING WORK ON PARTICIPATIVE APPROACHES IN THE THREE MEDIUM CITIES

Chapter 9. Experiments with participative approaches to sustainable urban planning in the three selected Chinese cities

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Abstract

The article synthesises lessons learnt from our experiments with participative approaches to sustainable urban planning in three Chinese cities selected for the MEDIUM project. On this basis, it presents proposals on the contexts in which such approaches can be used, how they could be implemented and on benefits that could be drawn from them. The chapter can be mainly a narrative of our “experiment”.

Keywords: Participative approaches; workshop methods; urban governance; communicational planning; intercultural dialogue.

1. Introduction

This chapter presents lessons learnt from experimental applications of participative approaches to sustainable urban planning in the three MEDIUM Chinese cities: Hangzhou, Zhuhai and Datong. The MEDIUM project experimented the use of such participative approaches in cooperation with local universities and planning authorities. These methods are based on an open, balanced and consensus-oriented discussions between urban development stakeholders, putting aside hierarchical relations between them. They are normally based on a ‘contract’ between city authorities and participants: city authorities commit to integrate their outputs in a specific planning process; participants accept to follow the dialogue rules set up by the facilitators and to engage in the process for its entire duration. In the case of the MEDIUM project, the situation was a bit different. The experiments were initiated by project team members, who with variable levels of success tried to convince relevant authorities of their relevance and potential added-value. Stakeholders were therefore invited to a process which was not ‘owned’ by city authorities; the use of its outputs remained uncertain.

The workshop process must therefore be described as tentative and experimental. As such, it fed into the exchange and mutual learning objectives pursued by the MEDIUM project. The objectives were to identify under what conditions Chinese urban development stakeholders and authorities would adhere to participative planning methods. Additionally, the organisation of the work-

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shops made it possible to gain a better understanding of urban governance patterns and trends in the concerned cities.

Concretely, in Hangzhou and Zhuhai, the project first worked with primarily post-graduate students at the different partner universities. These students were trained in participative planning methods and objectives. They then functioned as facilitators of participative planning workshops in their respective context. The organisation in Datong was a bit different. Due to the fact that Datong University does not offer postgraduate courses in planning, the project team organised a workshop which involved both stakeholders, academia and undergraduate students.

The chapter successively presents the different contexts of these ‘experiments’. First, the urban planning heritage, challenges and ambitions in each of the cities. Second, the general institutional framework for urban planning in China and the specific urban governance issues in each of our ‘test’ areas. On this basis, the third section presents the methods that were implemented and lessons learnt on this basis.

2. Urban governance frameworks for Chinese cities: different and novel forms of interplay between private and public actors

2.1 Participative planning remains limited in Chinese cities

The Chinese urban planning system is deeply influenced by the Soviet planning model, where the government sets the overall rules of planning and supervises the progress of public and private operational players (Curien, 2014; Douay and Qi, 2016). At state level, the Ministry of Housing and Urban-Rural Development (MoHURD) sets the strategic vision and regulation of planning in cities across the country and supervises the action of its sub-level entities that are embedded in sub-level (provincial and municipal) governments. The sub-level entities, for their part, obey the orders of their immediate supervisor of the planning system and play the role of planning authority in the provincial or municipal governments. They set the rules and procedure of planning activities and supervise the public and private players. French scholar Rémi Curien (2014) describes this as “a vertical pyramid structure” of current Chinese urban planning.

That said, the system is far from a strictly linear top-down authoritarian system in practice. Two major factors come to challenge the apparent pyramid function. First, besides urban planning that is administratively led by the MoHURD, land and spatial development in China is also controlled by two other types of planning, namely land-use planning and functional districts planning. The former is led by the Chinese Ministry of land resources and its sub-level organs. This system exercises its control on the use of state-owned land by approving land grant and transfer according to Chinese land-use laws and in respecting national land strategies such as the “1.8 billion mu farmland thre-



shold”(十八亿亩红线) that requires all local governments at different levels to collectively ensure a minimum of 1.8 billion mu (120 million ha)¹ of farmland at the national level (Shiuh-Shen, 2013). Functional districts planning is led by the National Development & Reform Commission (NDRC) and its sub-level organs. This system exercises its control by making industrial policies that are authorized by the Chinese constitution. As such, three pyramid systems exercise in parallel their control on city planning, with no or little horizontal interactions. Second, although the state government has nominal ownership rights over land across the country, local governments still have local information and immediate access to lands located in their jurisdiction. Therefore, local governments can consolidate their power over land development projects more easily than central state can, placing the later in a relatively weak position in specific local planning (Shiuh-Shen, 2013).

Note 1

Mu (亩) is the unit of area that is often used in China. 1 Mu corresponding to 1/15 ha or 666.7 m².

Since the post-reform era, in particular from the 1990s, Chinese planners have taken on a very proactive role in strengthening economy and shaping market (Douay and Qi, 2016; Wu et al., 2015). Under the fierce intra-city competition towards more financial support and political approval from upper-level governments, local political leaders are keen to initiate new land developments and produce strategic urban development plans in order to foster local growth. Planning has become the primary tool for municipalities to attract new industrial and residential developments and strategic plans are a key method to promote the area. Planning professionals and specialists, who are missioned by city authorities to carry out technical planning, share the conviction that planning can and should be a leading force in fostering economic growth (Wu et al., 2015). Foreign experts and technical firms are mobilised to provide expertise and to brand the urban development project (Jong et al., 2013). As such, authority, architects, planners, foreign specialists and industrial partners form an international growth coalition who put economic outcome at the forefront of new-town projects.

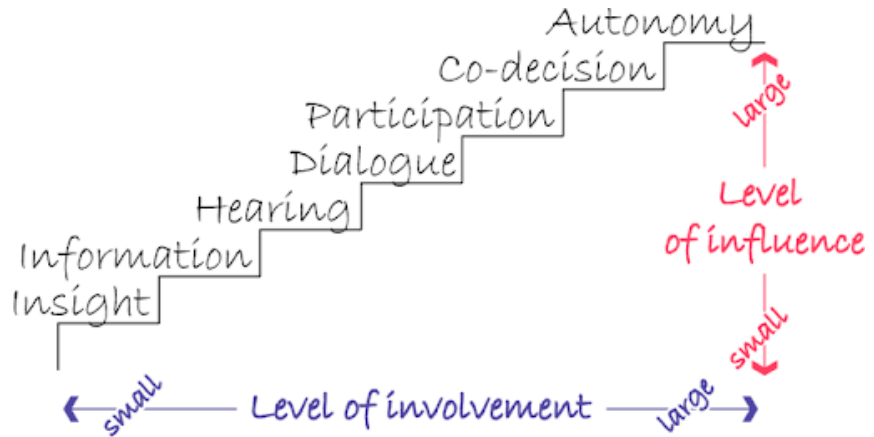
Decision-making processes within these alliances are opaque to the general public. Simply put, planning remains a scientific and technical issue controlled by a small group of political and professional elites, and focus on top-down policy dissemination on which citizens and citizen groups have little say. Besides, inter-personal networks (“guanxi”, 关系) make the informal side of influence and may prevail over formal organisational structures (Jong et al., 2013). Unsurprisingly, major sustainability issues such as ecosystem preservation, social equity and daily-life concerns of city inhabitants are often overlooked in this urban governance system.

This urban development driven by a concern for economic growth, which some scholar describe as ‘entrepreneurial’ (Pow and Neo, 2013; Shiuh-Shen, 2013), leaves little room for qualitative considerations and dialogue with local stakeholders. As a result, public participation remains limited, and tends to be “as a method of place promotion” (Wu, 2015: 73), through the organisation of competitions and exhibits. This implies that the public is kept at the lowest



levels of involvement and influence (insight and information) described in the Participation staircase (see Fig. 1).

Figure 1
Source: Adapted from Farner (2008).



However, this may be changing. Wang (2016) describes how public participation has been promoted and structured within the framework of Environmental Impact Assessment legislation over the last decade. “Interim Measures on Public Participation in EIA’ were first adopted in 2006, as China resorted to loans from major international financial organisations for some its development projects. Wang notes that these ‘Interim Measures’ were often not specific enough. As a result, authorities and developers could pay lip service to the principle of public participation, without actually implementing it in an effective or constraining way. These shortcomings have partly been addressed in the 2014 revision of the Environmental Protection Law. There are a number of studies of public participation in the framework of EIA in this period (Brombal et al., 2017; Wu et al., 2017). In 2017, the Ministry of Environmental Protection is said to be revising the ‘Interim Measures’ in order to compel authorities and developers to solicit public opinions more fully and to ensure that these were actually taken into account in the decision making (Wang, 2016: 157).

Chinese authorities may promote public participation in the hope that better knowledge of prevailing opinions among the public and stakeholder groups will help them to prevent antagonism. Meng et al. (2017) note that, in order to prevent large scale conflicts that have resulted from specific incidents or events, quasi-democratic institutions have been developed. This trend is linked to the concern for antagonism within the Chinese Communist Party (CCP), where it is considered as a factor of social instability. Quasi-democratic institutions are said to include citizen participation mechanisms, e.g. using through neighbourhood residential committees and internet forums. Based on a survey targeting 1,377 provincial-and city-level leaders, Meng et al. establish that “for many (though not all) local leaders, these quasi-democratic institutions are more than mere window dressing”.



2.2 Synthesis of experiences of governance framework in the three cities

The design of the participatory workshops took into account the general Chinese urban governance framework, but also the concrete planning issues and processes in each city. On-site research in the three cities of the project made it possible the spaces to be focused on. There were spaces targeted by development strategies, plans and official strategies and branding documents focusing on ‘sustainable development’. Therefore, the preparation of workshops followed two steps. First, the team of MEDIUM Young Researchers studied the local governance system in the three cities. Second, with the guidance of Spatial Foresight and the support of local partners, the team has analysed on references to ‘sustainable urban development’ in each city and identified the spaces that were targeted in this context.

While the governance framework of Chinese medium-sized cities involves fewer actors and levels than in major metropolitan regions, it remains highly complex. In a context of decentralized policy-making, urban governance is structured according to vertical chains of authority – top-down levels of hierarchy – but also to horizontal specialization (bureaus and departments). On the vertical level, the Central Government based in Beijing initiates national policy through guidelines, decisions, opinions or remarks, at the level of Ministries. These guidelines are followed and interpreted at each Provincial level by party departments and administrative bureaus while overseeing the policy implementation of all cities and counties under their administrative territory. But in practice, coordination is not so smooth and information is not always transparent. For example, Hangzhou, as a provincial capital, hosts both Zhejiang provincial government and Hangzhou city government, down to the district level. The decentralized system, and additional experiments in the power structure of “new districts”, make the governance framework and key actors highly difficult to access because of the decentralized system. Second and third-tier cities (such as Zhuhai in Guangdong province and Datong in Shanxi province) under the provincial authority execute policies at the level of the municipal government down to the district level, which has become an important policy-implementation entity in itself (Lam and Lo 2010). The multiplication of government bodies and the complexity of the official – and informal – hierarchies made the decision-making and policy implementation structure difficult to identify in order to set up a useful stakeholders’ workshop on urban sustainable development. This confirms the importance of an on-site team of experts working on the different steps required by participatory approaches, directly in context (as much as possible) and in close interaction with local partners and contacts.

Medium-sized cities produce multiple forms of local governance under the supervision of several layers of government and administrative units, while other entities such as high-tech zones or state-owned enterprises receive specific supervision (sometimes directly from the central authorities). Other actors, such as private companies are also sometimes involved in local policy experi-



mentations. The governance framework of medium-sized cities is thus particularly complex, between the political scales and work specialization of the administration, and local innovation (on experimentation and diffusion of local governance, see Teets and Hurst 2015). While the main objective of urban planning remains local economic growth (Wu 2015), other types of priorities are also pursued with reference to the notion of ‘ecological civilisation’ (生态文明) promoted by the Central Government (Marinelli 2018). Two fields stood out as key elements of the new pathways of urban development in the three cities of the MEDIUM project: the promotion of ‘green’ industries, and improving the aesthetic and functional qualities of the living environment. Given these common elements, we could notice that the planning strategy of the three MEDIUM cities pursue different patterns of post-industrial urban development. In the cases of Hangzhou and Zhuhai, city authorities create new urban areas such as high-tech zones; in the case of Datong, they organise a general makeover of the city to distance itself from its previous resource-based economy. The geographic focus of the workshops was by way of consequence different: they focused on the emerging high-tech zones in Hangzhou and Zhuhai, and on the city as a whole in Datong.

2.2.1 High tech zones planning and China’s entrepreneurial solutionism

In its transition from a socialist state to a developmental/entrepreneurial state (Wei, 2012), China has actively fostered the realization of industrial and development zones since the 1980s through several national-level government programs with the major aim of assisting modernization through technology transfer (Walcott, 2002) and of gradually reducing regional disparities (Ruiming and Renjie, 2011). In the last decades, these innovation-dedicated zones - with different ranks endorsed by different hierarchies of the state (Zhang and Wu, 2018) - have produced new spaces (Lefebvre, 1991) which have developed as large-scale “spaces of exception”, characterized by favourable taxation and policies, top-down governmental guidance and planning, and orientation towards the construction of high-technology-based new townships which successively came to fully integrate and provide also many other urban functions and services (e.g. educational, residential, commercial, etc.).

In China, national high-tech parks are approved by the central government and they are substantial operational units, managed by development corporations and quasi-governmental organizations which makes “their operation becomes more ‘entrepreneurial’ with a streamlined governance system” (Zhang and Wu, 2018). A number of organisations with multiple types of formal and informal interrelationships are engaged in their planning. This is the result of a Chinese planning culture characterized by “dispersed power derived from three sources: permission or mandate to administer rules (state), ability to control money (state, market, and, to a lesser extent, civil society), and the capacity to rally votes (states, market, civil society)” (Liang, 2011, 234) (Liang, 2011, 234). Liang (2011) reports that the development ideology, the mode of governance, the development agenda and the effectiveness of the planning mechanisms in



the high-tech zone planning is influenced by a network consisting of four groups of actors which have power at different levels: (1) a public group, which includes the state, local municipality, planning departments, and the Management Committee that deals with the detailed implementation of government projects (e.g. construction of roads, schools, hospitals, etc.) as well as with the evaluation of projects submitted by private companies and developers (2) a semi-public group, which normally includes municipality-owned development company; (3) a private group, which includes several entities from business clubs, individual science park, research/educational association, enterprises, and incubators; and (4) a civic group, that includes the general public and residents.

2.2.1.a Zhejiang Hangzhou Future Sci-Tech City and the journey towards an innovative nation

In line with the traditional entrepreneurial culture of the city, in 2011, Yuhang district - for long considered the “garden of Hangzhou” and annexed as urban district of Hangzhou in 2001 - was designated as national overseas high-level talent innovation base. It became a demonstration zone (together with Beijing, Tianjin and Wuhan), and it is currently implementing the planning of Zhejiang Hangzhou Future Sci-Tech City, a 113 km² area, embracing Xixi Wetland National Park and comprised of five streets - Cangqian, Wuchang, Yuhang, Xianlin, Zhongtai. Only until a decade ago, the whole area was still sparsely populated, covered mainly by scattered villages surrounded by farmlands and wetlands. However, in the near future it will be served also by high-speed railway and subway to drive urbanization and meet the demand of the growing population that have settled in the area.

In its official narrative, the planning of the Zhejiang Hangzhou Future Sci-Tech City claims to be oriented to the realization of an “upgraded Garden City”: a first-class environment suitable for talents and industrial agglomerations, where ecology, livelihood and production are all integrated.

Alibaba headquarters have also settled in the area. The provincial and municipal governments are counting on a spill-over effect. For this purpose, they have started the construction of the so-called ‘Dream Town’, i.e. the ‘Internet Village’ established in Cangqian, which is the main township in the Future Sci-Tech City area. In line with the “fourth industrial revolution” embraced by the Chinese Dream, this provincially branded digital project, which is responding to the central government’s policy directives, has gathered a coalition of business and government pouring resources into it (Keane and Chen, 2017). Its aim is to serve as a platform providing a low-cost place to start business and to support the narrative of a new world order characterised by emerging technologies that will redress the environmental damage caused by the previous revolutions. According to interviews held with the Management Committee, this is the entity mainly in charge of selecting the private projects that fit the best with the masterplan’s goals and of assigning land through bidding and auction. It was also reported that, in case of large and relevant projects (e.g. the construction of the subway), the Planning Bureau may publicize them on the



website or on the government portal during the selection phase or the Environmental Impact Assessment phase. Still, the Committee recognizes that because of time constraints public participation is limited to the informative level and in the case of potentially sensitive projects, e.g. waste collection centres, they will not publicize the information in advance to avoid to slow down the process, or inefficiencies and oppositions to them.

Moreover, to build what is conceived as a thoroughly modern and international office environment provided with high-end facilities, the Zhejiang Province, Hangzhou City and Yuhang district governments have also formulated a supportive policy to “forge a special talent zone” that offers, among other inducements (e.g. subsidies), entertainment, shopping, dining and sightseeing (ZOTP, 2015). Nonetheless, the attractiveness and wealth of Hangzhou and its brand-new urban areas has also made the city one of the most expensive Chinese cities to live in; the high cost living and increasing air pollution currently challenges the liveability of the city and Hangzhou’s brand itself (Delman, 2014).

2.2.1.b Zhuhai High Tech zone at the core of the Greater Bay area strategy

Bordering with Macao and located in the south-west bank of the Pearl River Delta (PRD) region, which is one of the fastest growing regions in China since the launch of the economic-reform and open-door policy in the late 1970s, Zhuhai only became a city in 1979 and, in 1980, it was decided to establish one of the first four Special Economic Zones (SEZs) in China within its borders. However, Zhuhai has adopted a different model compared to the other SEZs and to many cities in the PRD region whose strategy has been to focus on industrialization as the engine of economic growth. Zhuhai, in fact, has chosen to suppress polluting manufacturing companies and has introduced environmental protection regulations in order to maintain a high-quality natural landscape but it has also adopted several policies to increase its total population (now 1,6 million inhabitants) as well as attract and cultivate science and technology talents since the 1990s (Sheng and Tang, 2013).

In line with this legacy, Zhuhai High Tech zone is now at the centre of the Guangdong-Hong Kong-Macao Greater Bay Area (13th Five-Year Plan, 2016-2020) and key city within the regional masterplans addressing the overall industrial restructuring of Pearl River Delta whose major goal is, indeed, the development of five national new and high-end industrial districts (in Guangzhou, Shenzhen, Zhongshan, Zhuhai and Foshan) and over 10 provincial new and high-end industrial districts to facilitate industrial upgrading with focus on innovation. Zhuhai high tech zone - located in the northern part of the city, and as one of the first industrial and development zone approved by the Ministry of Science and Technology (MOST) in 1992 – is now bestowed with double preferential policies: Special Economic Zone (SEZ) and state high-tech zone (since 2015 it is, in fact, enlisted in the National Independent Innovation Zones). Its extension entirely coincides with Tangjiawan district (139 sqkm) and benefits from a significant location advantage, i.e. 18 km from Macau and 110 km from



Guangzhou and adjacent to Hong Kong and Shenzhen. It is comprised also of Tangjia town (historical centre which is now experiencing a relevant upgrading of its services and facilities, heritage buildings renovation, etc.), the University district (12 universities have opened colleges and education institutions), and Qi'ao ecological island. Moreover, the area is served by Beijing-Zhuhai Highway and Jiangmen-Zhuhai Highway.

Tangjiawan Planning Bureau, which is a branch of Zhuhai Construction and Planning Bureau, is the main responsible for the coordination of the overall planning (including land use) of the high tech zone, and the High tech Zone Management Committee, which enjoys the same level of power of Tangjiawan district, is in charge of organization and investment strategies and directly responds to Zhuhai City Government. According to interviews carried on with the Tangjiawan Planning Bureau, the high tech zone plans all go through very rigorous process, and different foreign experts and technical firms have been invited to design the master plan, which in the end was mainly done by Peter Calthorpe who proposed a low-carbon urban and transit oriented development (TOD). On the basis of this concept, several internal reviews among bureaus, expert meetings, public opinions hearing and online consultation have been conducted.

In the national urban development strategy adopted by the Chinese Government, the “small” and “green” Zhuhai is designated as the centre of the western bank of the Pearl River estuary. Local and regional stakeholders expect that the Hong Kong–Zhuhai–Macao Bridge will have a great impact on Zhuhai’s future development but one of the greatest challenges now is also whether Zhuhai can stick to its model of sustainable development in this new context. In this regard, for instance, questions are raised by the increasing need of land for urban construction which, as can be observed in Zhuhai high tech zone, makes the whole PRD one of the areas with the highest rate of land reclaimed from the sea.

2.2.2 Datong, from “coal capital” to the “blue sky”

Datong's urban governance in a post-industrial context can be understood under the importance of the new paradigm of city branding in city planning in China, and especially in resource-based cities.

This first relates to the promotion of “green” industries / industries, development of the private sector in order to end the coal-dependent economy. Following the central state authorities’ environmental concerns since the 11th Five-year Plan (2006-2010) until today’s 13th Five-Year Plan, unlike other cities in Shanxi where the environmental issues are still hard to address, the city of Datong managed to develop a green policy. It was especially the case after Geng Yanbo (2006-2013) was appointed mayor and put in motion a number of projects, which are further carried out by the current local authorities. However, the local application of these general environmental guidelines are, just like in any other Chinese locality, dependent on a number of factors which result in a “policy implementation gap” (Ran 2013). In the case of Datong, the first



factor is linked to the system of local political leadership and turnover. The cadre promotion and evaluation system orientates the projects towards initiatives with high political accomplishment (政绩, *zhengji*) but also with a short-term projection, in order to ensure promotion (Eaton and Kostka, 2013). The second factor is economic, the municipality of Datong being coal-dependent and thus followed the cycle of the coal industry. Just like in other municipalities, local leaders followed “neoliberal urbanism” (He and Wu, 2009) with entrepreneurial orientations of “green” policy-making and short-term initiatives implemented through debt-financing in their objective to impulse growth-oriented projects. The high-speed railway and the establishment of Yudong New District are examples of this trend. During mayor Geng Yanbo’s political term, Datong city government implemented strict control over the coal mines and closed the main polluting heavy industries, limiting the problem of miners’ safety addressing the problem of “overcapacities” in the state sector and introducing “model” state mines based on the circular economy (Tian, 2016). In a more recent plan, the municipal government addressed the reduction of air and water pollution, and the development of non-coal energies in the former coal mining territories, introducing solar and wind energy as well as reforestation². But despite the development of Yudong New District and its technological zone, long-term issues (education and employment, for example) and the social cost of the coal crisis since 2013, have not yet been fully addressed. The short-term, ambitious projects got slowed down by difficult financial capacities in the context of the coal crisis, of the strict control over the local public budgets, and of Xi Jinping’s anti-corruption campaign. After Geng Yanbo was transferred, the local cadres in Datong fell under investigation. Between 2014 and 2015, Datong city government did not have a Party Secretary and all the construction sites remained empty, as a consequence of the overheating real-estate activity in resource-based cities (Shepard, 2015). Moreover, the delimitation between public and private actors is hard to establish, as state-owned enterprises are still strongly involved in the city’s urban affairs. As a result, the governance system has a hybrid form, between the “neo-danwei” (Cliff, 2015) and the city government.

Second, Datong authorities have been seeking to commodify a high-quality urban environment through large-scale urban renewal. The governance of the city of Datong during the 2008-2013 period represented an important turn in the city form and landscape. In 2008, the city centre became the object of an ambitious plan of urban makeover around the theme of the “historical and cultural city”, put in motion between 2008 and 2013, which led to a large operation of demolition-reconstruction well described in the documentary film by Zhou Hao, “The Chinese Mayor”. The ambitious plan of transformation introduced by Mayor Geng reveals how “entrepreneurial” trends of urban governance in Chinese metropolises have reached the resource-based cities. City branding and city image through “green” marketing, as well as tourism and “cultural” labels seem to have become new paradigms of growth in urban planning. Marc Rousseau (2013) showed in his two case studies about Roubaix and Sheffield, that the politics of city image were an essential part of urban gover-

Note 2

«Datong’s plan to reduce carbon emissions in 2018» (山西大同2018年主要大气、水污染物总量减排计划), *Beijixing Daqiwang*, 11 September 2018, <http://huanbao.bjx.com.cn/news/20180911/927080.shtml> (Accessed on 29 November 2018).



nance for their transition in the context of post-industrial reconversion. Today, Datong has won the greenification competition in Shanxi province: the “blue sky” has become the city’s slogan: “Datong Blue” (大同蓝, *datong lan*).

Third, there have been specific challenges in urban governance after Geng Yanbo’s transfer. First of all, the urban governance system in Datong is complex because it is still hybrid, characterized by a massive presence of the state sector in public affairs, such as Datong Coal Mine Group (*Tongmei* in Chinese). Local governance depended on the local interests between the coal industry – providing employment and growth – and the urban development projects of the city administration. The industrial governance system involving “neo-danwei” makes public participation quite limited, and internal to such massive state-owned companies. As for the public authorities at the municipal level, the frequent turnover of cadres at different levels of the hierarchy and in different departments still limited the participation of the public in local affairs. During our own field research in Datong, during the anti-corruption campaign, it was difficult to identify clear decision-making bodies as well as local citizens’ interest groups³. The project of urban demolition and construction of Geng Yanbo was implemented between 2008 and 2013 under a fast temporality. Local residents had few opportunities to become part of the plan, except by trying to obtain special favours of the mayor or by becoming nail-houses. Geng’s plan suddenly interrupted because of a difficult political transition when the mayor got transferred in 2013, leaving the remaining residents in a state of uncertainty towards the future. The participation of the public is thus limited to public protests at the city government building. However, as some scholars have suggested, the involvement of citizens in participatory planning is necessary in order to improve the sustainability of urban development (Kotska and Mol, 2013). Considering the city’s radical turn in terms of urban and economic restructuring, and in collaboration with our local institutional partners, it appeared relevant to organise a participatory workshop discussing the whole city’s sustainable development perspectives and challenges.

Note 3

To understand the local situation at the time, see: “In China’s Coal Capital, Xi Jinping’s Dream Remains Elusive”, *The New York Times*, 21 October 2017, <https://www.nytimes.com/2017/10/21/world/asia/china-xi-jinping-datong.html> (Accessed on 29 November 2018).

3. Experiments with participative approaches

3.1 Theoretical frameworks for participative approaches: notions of public space, levelling the playing field

Participative methods that have been tested and promoted as part of the MEDIUM project are consensus-oriented. The objective is to identify, develop and specify issues that could be addressed and solutions that could be implemented on the basis of consensus between stakeholders involved in the process. This does not imply that possible antagonisms, diverging interests and ideological dividing lines are brushed under the carpet. They are identified as relevant contextual factors and possible constraints for consensus-based action. It is clearly specified to participants that the purpose of the participative method is not to overcome differences of opinion or of interest. Instead, they are encour-



raged to collectively elaborate strategies and action plans that could be implemented on the basis of consensus while acknowledging these differences.

As such, they are embedded in the theories of Jürgen Habermas. Habermas identifies a, to some extent hypothetical, 'ideal' public sphere in the European bourgeois society of the 18th century, where a dialogue focusing on the pursuit of the common good was possible. He also describes historical processes that have led to a degeneration of the public sphere. From the French revolution, the assertion of class interests makes the public sphere confrontational. Irrespective of the legitimacy of this assertion of class interests, one observes that this may prevent actors from focusing on the public good. Furthermore, while publicity was initially conceived as the principle of transparency, it has become increasingly subverted by media and market actors pursuing own agendas (Habermas, 1962). More recently, the development of social media has generated a public sphere where it may be difficult to distinguish public participation and actions of more or less structured interest groups. In response to such trends Habermas (1962) suggested the possibility of artificially recreating public spheres where framework conditions for the pursuit of the public good would be recreated.

This idea *inter alia* presupposes that inequalities between citizens and stakeholders would be temporarily put aside. Furthermore, involved actors would engage in exchanges in specific state of mind. They for example need to acknowledge the legitimacy of their dialogue partners to express their opinion on the considered issues. Additionally, equalities in deliberation must be ensured. Extensive debates on the possibility of such a debates ensued (Fraser, 1990). Some authors for example emphasize that the Habermas's 'deliberative model' corresponds to ways of expressing oneself and of interacting with others that are typically associated with highly educated, male and white citizens in western societies (Young, 1996). It may be difficult to overcome social norms and habits in the framework of a 'participative workshop'.

Participative methods acknowledge these critiques. They are primarily based on the idea that awareness of possible pitfalls helps to limit risks. While there are never any guarantees that a dialogue will be balanced, observed biases may be accounted for and compensatory measures may be implemented. Participative methods therefore pragmatically seek to find solutions to allow for more informed and consensual decision-making within complex settings. They incorporate social, institutional and cultural contextual factors and seek to neutralise identified risks. The process of elaborating and implementing participative methods is based on a 'contract' between a process owner (i.e., in most cases, the public authority) and the participants which incorporates three main dimensions.: first, the selection of a representative group of participants; second, a process with some major steps; third, an agreement on how the outcomes of the process are going to be used.



3.2 Description of experimental approaches tested as part of the project in the three case areas. Observations made on this basis

Empirical experience with participative approaches shows a strong need for adaptation of theoretical frameworks to the actual situation and needs. This refers to various aspects including, for instance, planning issues at stake, types of stakeholders involved, planning cultures, communication cultures etc. Theoretical frameworks for participative approaches as described above stem principally from a European background, where cultural divergence may be relevant but relatively small adjustments are usually sufficient since the principle of participation has a similar meaning across European countries, in particular within the EU. Transferring them to the context of Chinese medium sized cities requires much more adaptation due to:

- very different planning history and systems not comparable with European planning systems;
- the understanding of what is a medium-sized city;
- the types of issues at stake that may not be apparent from a European perspective;
- the predominance of non-participative teaching methods;
- little to no experience of stakeholders with participative approaches.

These and possible even more differences do not only require to adjust the implementation of participative approaches but to introduce them differently. This starts with establishing the terminology of participative approaches, which itself can be challenging, and setting the scene by developing a common understanding of the role of participative approaches. Developing a common understanding started with discussions on several questions:

- What are workshops?
- What are participative workshops good for or why conduct workshops using participative approaches?
- Why are participative workshops useful for policy makers?
- What are possible outcomes of participative workshops?
- What are framework conditions for participative workshops creating an open discussion environment? What is important to consider in the workshop design?
- What is our common understanding of sustainable urban planning?

Developing this common understanding was a preparatory step to then conduct a participative workshop on sustainable urban planning in each of the three cities. Already during this preparation phase, participative methods were used to tune participants for the participative workshop atmosphere. This included, *inter alia*, introductions to the activities, bilateral exchanges and joint discussions. Experience shows that such exercises that level any hierarchies between participants help creating an atmosphere in which participants can



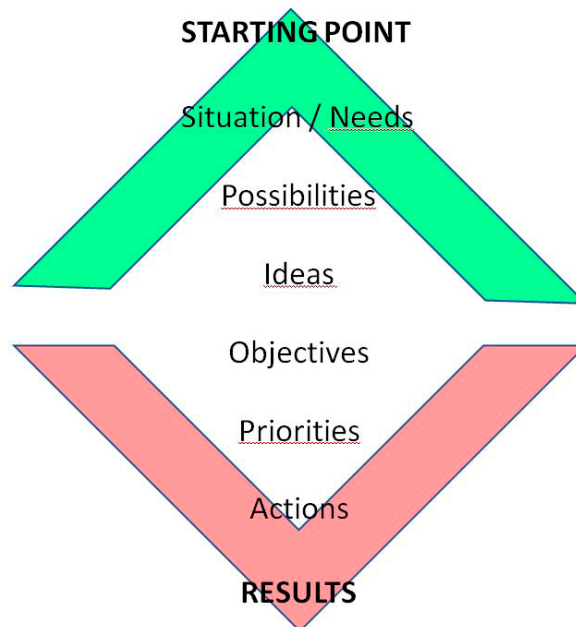
exchange their views freely and openly. In addition, in a context with participants not used to the idea of facilitation, these exercises illustrate the role of a facilitator as opposed to that of speakers or presenters. In other words, they 'tuned in' participants to an event format completely new to them.

The actual workshop on sustainable urban planning was conducted along five working steps, each of them building on the findings of the previous steps. These steps followed the overarching logic of workshop phases starting with Opening up during the first steps. Ideas' collection, diversity and uncritical brainstorming characterise these steps. The following narrowing down reduced the focus on few issues and critically reviewed the findings (see Fig. 2).

Each of the working five steps contained followed a similar structure with priming participants for the next task, clarifying next task, grouping for actual discussions, discussing the task of the step, collecting ideas or findings and agreeing on findings. For each step, specific participation elements were designed. Participation already started during the clarification phase of each working step.

For clarification the respective following task was simulated by applying different means. Examples are the assigning of pre-defined messages to applied terminology, assessing the meaningfulness of a target formulation or comparing pre-defined formulations regarding their implication and meaning. The main objective of these exercises was to establish a common understanding of the following task's terminology.

Figure 2
Principal workshop phases and working steps for sustainable urban planning workshop.
(Source: authors elaboration).



The importance of developing a common understanding and the difficulties encountered can be illustrated with two examples:

- SWOT analysis. An exercise with fictive strengths, weaknesses, opportunities and threats highlighted that assigning an observation to either of the four categories can be highly ambivalent. Indeed, the same observation may be a strength in one case and a weakness in another case. This does not only depend on the location but on the stakeholder perspective and the issue considered. The exercise showed that for an appropriate assignment of an observation, explaining the rationale for the assignment was most important. The differentiation between strengths and opportunities on the one hand and weaknesses and threats on the other hand proved even more difficult. This required a clear understanding of the differentiation between current observations and existing structures, situations etc. and potential future developments or other aspects that may create effects in the future.
- Needs, objectives and targets. These terms are often used synonymously. This leads to a two-fold challenge in a participative workshop, namely a linguistic and a methodological challenge.

The question of translation, not only of notions but also of meaning, deserves to be addressed. From the experience of our three workshops during the MEDIUM projects, our teams of young researchers noticed how important certain abstract keywords and ideas were in order to set up the stakeholders' workshop in China. The most important notion, "stakeholders' workshop", was at the beginning translated as a "seminar" (专题研讨会, *zhuanti taolunhui*) during the preparation of the first workshop in Hangzhou in 2016. It was reconsidered after this first experience because it really did not really contain the idea of a horizontal discussion, and of free space of debate between all involved participants. This might have explained why strong hierarchical divisions between different participants still existed during the different steps of the workshop. The next workshops were more precisely presented and translated as "workshops" (工作坊, *gongzuofang*). Another notion was difficult to introduce in Chinese language: the notion of "stakeholders" was first translated with a managerial notion of "ganxiren" (干系人); it was, in the end, translated as "liyi xiangguanzhe" (利益相关者) but the complete meaning of the idea was still not fully clear to the participants and translators used sentences to help define the word. In addition, the workshops revealed that it was sometimes difficult for Chinese workshop participants to understand the difference between "targets" and "objectives" due to translation issues. In Hangzhou in 2016, the Chinese translation of "target/mubiao" was used for "objective". The notion of target was in fact considered as preliminary objective (目标的初步, *mubiao de chubu*). During the workshop in Datong in June 2017, the Chinese



translators tended to use the same Chinese translation of “target/mubiao” to qualify both ideas, without really differentiating “targets” (目标, *mubiao*) and objectives (目的, *mudi*). Finally, our practical experience of the three workshops confirms the importance of not only translation, but also of mediation and facilitation during the different steps of the workshop, in order to pass on the full meanings of the notions introduced around participatory methods, as well as in order for the Chinese participants to understand and adapt Western conceptions of « sustainability » and « stakeholders » to their inter-personal exchanges during the workshop. Mediation/facilitation work is also very useful in order to help the workshop participants move from very concrete and local issues to more general levels of discussion as a way to bring the participants to a more reflexive content of the debate.

Based on the needs identified with the SWOT analysis, objectives and targets were to be developed. While needs describe what should be changed, objectives describe a future situation that should be achieved. Thus, formulating objectives requires looking beyond the current situation and formulating what should be changed, without describing how this is to be achieved. For developing actions required to achieve the desired future situation, the objective needs to be specified, to ensure that its formulation is clear, measurable, achievable, relevant and time-bound (the so-called SMART criteria). Figure 4 illustrates a fictive example for how to differentiate the three terms and to develop targets from objectives and needs, objectives and targets.

Figure 3

Fictive statements illustrating a SWOT analysis.

(Source: authors).



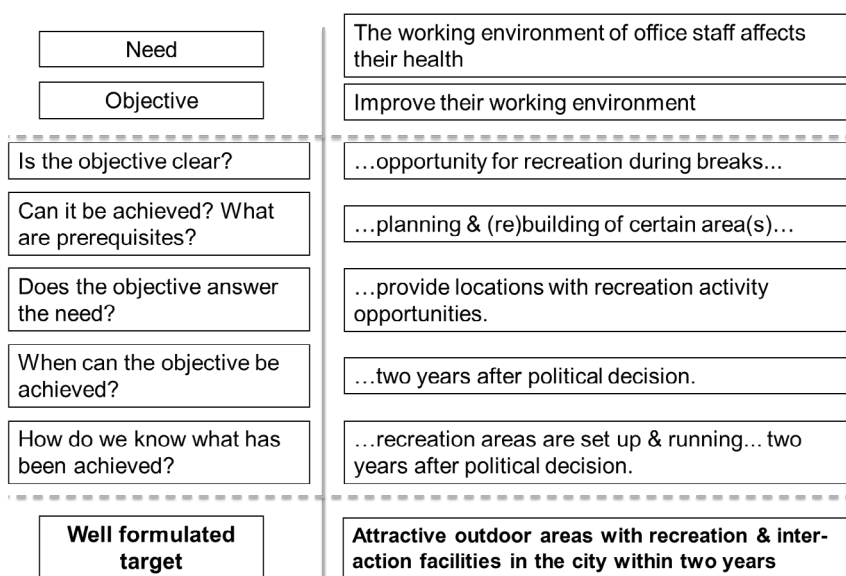


Figure 4
Developing a well formulated target from needs and objectives.
(Source: authors).

Each working step applied specified participative methods to address the individual working step with a view to the overall objective of the workshop. The table below summarises the methods of the five working steps. Each step was facilitated and visualised to ensure that no relevant discussion points or findings would be lost during the process. Facilitation by Chinese speaking participants was supported by facilitators experienced with participative planning who were available for clarification etc. throughout the process.

Table 1
Overview of participative methods applied.
(Source: authors).

WORKING STEP	METHODS APPLIED	MEANS OF VISUALIZATION
Needs & issues	<ul style="list-style-type: none"> Strength-Weaknesses-Opportunities-Threats (SWOT) Analysis in group discussions. Presentation & discussion of different SWOT finding jointly in plenary. 	Flipcharts with the four SWOT elements.
Objectives & targets	<ul style="list-style-type: none"> Group discussions in which stakeholders take their individual perspective. Presentation of identified objectives in plenary. Followed by voting in the plenary to select objectives that shall be further elaborated. 	Empty flipcharts to be filled towards the end of the group discussions by structuring up to three objectives.
Actions	<ul style="list-style-type: none"> Parallel group discussions on selected objectives. Allocation of participants according to interest. Presentation of actions in a rotating vernissage. 	<ul style="list-style-type: none"> Flipcharts displaying the objective to be discussed. Collecting ideas on actions and organising them (e.g. showing relations between actions) on the flipchart, using different sizes and colours of post-its.



WORKING STEP	METHODS APPLIED	MEANS OF VISUALIZATION
Refined actions	<ul style="list-style-type: none"> Continued group discussions with partially changed composition of participants. Checking on order and relations of actions, possibly further detailing them. 	Further elaboration of the previously developed flipcharts utilising additional colours, post-its etc. to visually differentiate findings (e.g. actions & stakeholders, relations).
Actor analysis	<ul style="list-style-type: none"> Adding relevant stakeholders to refined actions, possibly also including a first time line and further requirements. 	

Taking into account the specific framework conditions introduced above and the overall objective of participative workshop approaches, a few guiding elements were crucial for successfully organising the workshops:

- Participation as golden thread. All participants were challenged to become active from the very beginning of the workshop. This was realised by exercises for the initial opening and priming rather than opening with presentations. Throughout the workshop, presentations were kept to a minimum assigning by far most time to discussions.
- Adjusting clarification to the needs of the group. To prepare participants neither used to participative approaches nor the terminology of sustainable urban planning required interactive clarification methods to ensure facilitators were aware of the degree of realised clarification.
- Flexible timing of tasks and within working steps. Allocating sufficient time to discuss terminology was crucial to allow for group work achieving the objective of the individual tasks, e.g. conducting the SWOT or formulating actions.
- Use of flexible visualisation means. Appropriate visualisation was crucial throughout the process. During priming it supported preparing the next working step. Visualisation displayed all discussion elements and findings to help participants following different discussion threads. Flexibility allowed adjusting visualisation to changing findings during the process. And showing all outcomes throughout the process worked as a reminder of how final results were obtained.
- Changing discussion groups and roles. Changing methods implied containing the attention of the participants. Changing the composition of groups avoided establishing certain discussion or group dynamics that may hamper contributions of less active participants.
- Go meta between tasks. The whole workshop process was interrupted by short 'meta' sessions that reflected the previous task in its role of the whole process and helped facilitators assessing if adjustments for the further process were required.



4. Synthesis of findings and perspectives

Testing participative methods in Chinese cities can overall be described as a fruitful experience both for researchers introducing the methods to the Chinese context and for Chinese participants learning about and gaining first experience with these approaches. Researchers experienced openness of participants to involve themselves in a participative environment, and to put aside hierarchical relations for the duration of the exchange. Once the overall principle of participative approaches was clarified and understood, participants felt indeed invited to engage in open discussions and to express their views freely. However, a significant number of initial misunderstanding had to be overcome. These were partly linked to the difficulty of conveying the notion of ‘workshop’ in Chinese.

Introducing participative methods that have primarily been developed and implemented in a European context in China also implied some trial and error processes. The project process made it possible to acquire know-how on the issues and challenges to be addressed. Solutions were designed and improved during the project process, e.g. clarifications on the terminology used and preparatory exercises making it possible to avoid possible pitfalls in the dialogue process. Insights were also gained on prevailing understandings of the concept of sustainable urban development. By reflecting on difficulties experienced during the first training and workshop sessions, researchers adopted their approaches over time.

The MEDIUM project’s experiments led to an improved awareness of how full-scale participative planning processes could be implemented in Chinese cities. First, the processes need to be supported by local resource persons that can devote at least half of their time to the process throughout its duration. Convincing local authorities of the potential added value of the approach, integrating it into existing planning processes and explaining its principles and potential added value to urban development stakeholders are substantial tasks. These resource-persons function as links between different culture and languages, as well as between facilitators of the participative planning process, participants and recipients of its output. Their interpersonal and linguistic skills are of critical importance for the success of the process; they need to be confident when interacting with local authorities and explaining/translating the ‘why’s’ and ‘how’s’ of participative approaches

One of the roles of the resource-person is to maintain the momentum of the participative process throughout its duration. An insufficient commitment over time is a recurring problem. It can be observed both among relevant stakeholders and local authorities. Meetings need to be organised regularly to maintain the momentum, without overburdening involved parties. The thematic focus and methods of the participative process sometimes need to be adjusted during the participative process, e.g. to adapt to a changing policy agenda, to interests of newly appointed authorities or to an evolving economic and social context.



Such issues are not unique to the Chinese context; they can be observed in all participating planning processes. The MEDIUM project has simply helped to demonstrate the feasibility of an approach that, if implemented fully, could have a significant impact on urban development in concerned cities. It has shown that a number of local and regional authorities are interested in this approach. The MEDIUM experiments have been an eye-opener for a number of involved parties. They have made them aware of the variety of applications of participative approaches, including their potential role to address conflicting interests and to improve the quality of dialogues between stakeholders representing different positions. However, stakeholders were more or less receptive to the participatory process. The Management Committee of the Zhejiang Hangzhou Future Sci-Tech City did not participate in the workshops and was not willing to discuss its outcomes. This can partly be ascribed to the fact that planning and construction process were already at an advanced stage, and that they were being implemented with particularly tight deadlines. The Zhuhai planning office considered that the workshop process could potentially be beneficial to its planning process and played a more active role both in the preparation and implementation of the workshops. Timing and interpersonal relations are therefore essential components when seeking to establish a dialogue with planners and authorities.

Admittedly, the MEDIUM project conducted experiments with participative approaches in only three Chinese cities, none of which were metropolitan regions or small isolated agglomerations. Thus, it cannot be concluded that experiences made in these three cities would work similarly in other Chinese cities. However, the accumulated positive experiences confirm the feasibility of transfers of planning methods and encourage further attempts.

However, methods and approaches have to be adapted to each context. Issues, challenges and opportunities differ greatly from city to city, with respect to topics of interest, governance settings, path-dependencies and multi-level governance perspectives. Understandings of what sustainable urban development entails and presupposes also vary greatly between stakeholders. There is a significant gap between European and Chinese stakeholders in this respect, which a stronger dialogue could help to overcome. The workshops also helped to identify that different opinions on fundamental planning options. For example, some stakeholders in the two cities development High Tech zones (Hangzhou and Zhuhai) wondered if alternative and more diverse development models would not be more purposeful. For instance, in the case of Zhuhai, some claimed that focusing on quality of life and services for the many retirees that come to live in the city could be a better option, to match both the need of economic specialization and the growing social demand of an aging population. In the case of Hangzhou, the SWOT analysis, for example, highlighted the risks of betting all on innovation and entrepreneurship without advancing enough in terms of corporate responsibility and without considering enough the side-effects, mainly in terms of waste, energy consumption and urban-sprawl, resulting from such large-scale urban development and the intrinsic threats it poses



to other sectors (such as the primary one) and to ecosystem services. One also needs to take into account the fact that a significant number of Chinese citizens consider that they only need to concern themselves with the satisfaction of their personal needs; wider and long-term sustainability issues are from their perspective a governmental responsibility.

Thus, it can be concluded that the promotion of participative methods could be a fruitful method of promoting more resilient urban development in Chinese cities if implemented at larger scale. From a European perspective, this may be justified as part of a policy to encourage Chinese authorities' own initiatives in favour of public participation, illustrated by the revisions of the EIA regulations. It would make it possible to get a clearer understanding of decision-making processes, which remain difficult to 'disentangle' even at the end of the MEDIUM project. However, making this happen requires a different type of project set-up. This includes, inter alia, a clearer focus on funding a small stable team of 'resource persons' that prepares, accompanies and follows up the participative event.

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A N N E X

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Rutian Li, Chinese-English translator

Sun Yat-sen University, School of Geography and Planning

Desheng Xue, professor in Geography, dean of the School

Chunshan Zhou, professor in Geography, Zhuhai Campus

Suhong Zhou, professor in Geography, SYSU

Chenyi Shi, master student at SYSU



Annex 2. Beneficiaries of the mobility schemes to China, and related supervisors under the MEDIUM project

Valentina Anzoino (2015-2017, 24 months), PhD in Information society, postdoctoral researcher at the European Centre for Living Technology, Ca' Foscari University of Venice.

Supervisor: Irene Poli, professor at the European Centre for Living Technology, Ca' Foscari University of Venice.

Iraklis Argyriou (2015-2016, 12 months), PhD in Energy and environmental policy, postdoctoral researcher at the Géographie-cités research unit, CNRS/University Paris 1-Panthéon Sorbonne.

Supervisor: Nicolas Douay, associate professor at university Paris 7 Denis Diderot.

Judith Audin (2015-2017, 24 months), PhD in Political science, postdoctoral researcher at CHERPA, Institut d'Etudes Politiques d'Aix-en-Provence.

Supervisor: Jean-Pierre Gaudin, professor at the Aix Institute of Political Science.

Antonio Ignazzi (2015-2016, 10 months), PhD in Geography, postdoctoral researcher at the Géographie-cités research unit, CNRS/University Paris 1-Panthéon Sorbonne.

Supervisors: Denise Pumain, professor in geography at Paris 1-Panthéon Sorbonne; Céline Rozenblat, professor in geography at University Lausanne.

Cinzia Losavio (2016-2018, 24 months), PHD candidate in Geography, Géographie-cités research unit, CNRS/University Paris 1-Panthéon Sorbonne.

Supervisor: Natacha Aveline-Dubach, CNRS professor at Géographie-cités (also supervisor of the PhD)

Juste Raimbault (2016-2017, 6 months), PHD candidate in Geography, Géographie-cités research unit, CNRS/University Paris 1-Panthéon Sorbonne.

Supervisor: Denise Pumain, professor in geography at Paris 1-Panthéon Sorbonne.

Natacha Aveline-Dubach (2017-2018, 4 months), CNRS professor at Géographie-cités, Paris, coordinator of the MEDIUM project.

Elise Ho-Pun-Cheung (2017-2018, 8 months), PhD candidate in Political science, researcher at CHERPA, Institut d'Etudes Politiques d'Aix-en-Provence.

Supervisor: Jean-Pierre Gaudin, professor at the Aix Institute of Political Science.

Yinghao Li (2017, 6 months) PhD in Urban hydrology, postdoctoral researcher at the engineering school Ecole des Ponts, Paris East University.

Supervisors: Céline Bonhomme and José-Frédéric Deroubaix, University Paris-Est, Laboratoire Eau Environnement et Systèmes Urbains, Ecole des Ponts ParisTech.

Marco Pesce (2017-2018, 11 months), PhD in Environmental science, postdoctoral researcher at the European Centre for Living Technology, Ca' Foscari University of Venice.

Supervisor: Andrea Critto, professor at Ca' Foscari University of Venice.

Fabio Della Marra (2018, 3 months), PhD in economics and social sciences, postdoctoral researcher at the European Centre for Living Technology, Ca' Foscari University of Venice.

Supervisor: Andrea Critto, professor at Ca' Foscari University of Venice.

Aureli Lojo Blesa (2018, 1 month), PhD candidate in Geography, Autonomus university of Barcelona. Aureli spent a month in Zhuhai, but he unfortunately had to return to Spain for health reasons.



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