A Network Governance Approach to Transport-Land Use Integration: Evidence from Urumqi, China

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1. Introduction

Decades of rapid development has made China a global economic heavyweight, significantly increased personal disposable income, while led to the grandest urbanization process in history and caused a highly car-dependent urban transportation and sequentially serious environmental and congestion problems. Unlike before, urban residents are not only travelling longer distances, but also making more trips and relying on modes using fossil fuels (Wang 2011, 2013). Over the past ten years, the number of trips by public transport has been doubled but the transit modal split has fallen from approximately 60% to 30% in major Chinese cities (Mu and de Jong 2012, Jiang and Han 2009). Private car ownership has risen from 15 million in 2004 to 105 million in 2013, equal to 25000 new cars swarming into roads everyday (China Statistical Yearbook 2013). Consequently, travelling speeds on urban arterials during peak hours often drop below 15 km/h or even 10 km/h in large cities (Wang 2011, Marchau et al. 2008).

Along with the tremendous change in urban transportation, the structures and processes of policy-making for urban transport are also shifting. Traditionally, to control traffic jam, China adopted a hierarchical approach. Governments at different levels playing a strong role in subsidizing public transport, and simultaneously restricting private car purchasing and usage through command and control methods (e.g. congestion pricing, new plate quota, driving bans and fuel taxes). However, the many reports about the failure of hierarchical approach (Wang 2010, Sun et al. 2014) have triggered an increasing use of market approach to improve the efficiency of public transport services. Hence, privatization and commercialization of state-owned transit operators, competitive deregulation and contracting out transport services have

prevailed over the past decade (de Jong et al 2010, Mu et al. 2011). Unfortunately, problems appear again such as imperfect competition, unstable and insufficient market supply and growing inequality (Mu et al. 2010, Mu et al. 2015). As such, neither the hierarchical nor the market approaches could improve the attractiveness of public transport and induced a modal shift from automobile to public transport.

Now, a growing number of scholars and policy-makers have recognized that congestion problems in fact go beyond the transport sector itself and touch tightly upon the land use sector: the distribution of different land uses in different locations stimulates the demand for transport and influences modal choice, and the supply of transport creates accessibility of land parcel and enables the distribution of land uses. Therefore, there are increasing calls for greater planning and policy integration between transport and land use, which is crucial for the development of sustainable transport and thus the remission of congestion in large urban areas. However, in this interactive relationship are bound up the logic of transport geography, transport planning, accessibility, land planning and real estate/property market, an implied division of labor and associated economic and industrial geography; and hence the concerns of various kinds of transport and spatial planner and decision-maker, public transport operator, employer, retailer and developer; and ultimately the travel and location decisions made by every citizen (Marshall and Banister 2007:1, Dittmar and Ohland 2009:43).

Apparently, transport and land use integration occurs in a multi-actor system. The hierarchical and market approach would fail to facilitate collectively oriented and pro-active governance on the basis of joint objectives. However, the newly established theory on network governance is more prospective in creating integrated planning and policy-making for transport and land use because it emphasizes negotiation and interactive policy-making through the formation of strategic alliances, dialogue groups, consultative committees and inter-organizational networks among various public and private actors.

Therefore, Chinese governments need to abandon the false choice between state and market governance and to explore the role, function and impact of different kinds of governance networks. In particular, it is clear that solving urban transport problems increasingly take place in and through interactive forms of governance involving a plurality of organizations and actors in both transport sector and land use sector. This does not mean that the governments are “hollowed out”, but the idea of the state governing society top-down through mandatory intervention and detailed regulations is losing its grip, and is being replaced by new ideas about network governance based on interdependence, negotiation and interaction.

The goal of this research is (1) to see if the theory on network governance, pioneered by western leading scholars Eva Sorensen and Jacob Torfing (2008), Jacob Torfing and Peter Triantafillo (2011) and Jacob Torfing, B. Guy Peters, Jon Pierre and Eva Sorensen (2012) can be applied to understand the Chinese policy context, and (2) to investigate what the positions of large Chinese cities are in terms of urban transport

and land use integration seen from the network governance approach. The remainder of this article is organized as follows: in Section 2, we will look at the theoretical state-of-the-art on network governance and ask the question how to measure the degree of integration between transport and land use? In Section 3, we will discuss our data sources and methods of data analysis, i.e. the steps we have followed and the decisions we have taken to measure the degree of integration in the following empirical research. In Section 4, we examine the integration level of transport-land use in Urumqi, a city in China with the most noticeable characters of the fragile physical environment, complex ethnic mix and changing political systems and policies. And finally in Section 5, we will conclude with the theoretical reflections and policy implications of the empirical findings.

2. Towards a Network Governance Approach to Transport-Land Use Integration

The recent academic focus on network governance has an empirical background in the widespread recognition of the increasingly fragmented character of urban planning and infrastructure management (Sorensen and Longva 2011, Blanco 2015). In the field of transport and land use planning, the challenge of how to lift fragmentation has existed for many years, but has remained unsolved, in part due to the unbundling and functional differentiation of transport planning and land use planning into relative autonomous departments and in part due to inadequate channels of communication as well as the blurring and contestation of the boundaries and regulatory scales between researchers, planning officials and policy-makers. A World Bank study (Suzuki et al. 2013) reveals that departments' varying missions, objectives, budgets, management styles, governance structures and staff profiles often cause sector silo behavior and hinders cross-sector and interagency coordination needed for transit and land-use integration. In addition, Hrelja (2015) also shows that different management and working practices and distinct steering cultures in local authorities are the underlying reasons leading to a fragmented transport and land use planning in urban areas. This can result in frustrated causes: state-of-the-art projects based on out-of-date research, novel research addressing old problems, old data feeding new models and generally "left hands" not knowing what "right hands" are doing.

It is against this backdrop that there has been a rise of the network governance approach through the shaping of interactive networks of capable and responsible actors forges new links between land use planning and transport planning and spurs the process of policy integration. Following Sorensen and Torfing (2007:9), an interactive governance network is defined as follows: (1) a relatively stable horizontal articulation of interdependent, but operationally autonomous actors; (2) who interact through negotiations that combine bargaining and deliberation for the purpose of gaining resources to maximize outcomes; (3) which take place within an institutionalized framework that is amalgam of formal procedures, rules and laws; (4) that is self-regulating since they are not part of a hierarchical chain of command and do not subject to the laws of the market; and (5) which contributes to the production of public purpose such as the general public's expression of visions, values, plans and

policies.

As defined above, interactive networks are increasingly seen as a suitable response to the question of how to tackle fragmented and conflict-ridden policy problems. First of all, interactive networks are claimed to have a large potential for proactive governance as the network actors can identify policy problems and new opportunities at a relatively early stage and produce flexible responses that allow for adjustments to the concrete conditions (Klijn and Koppenjan 2000, Kooiman 2000). In town planning, many scholars consider proactive governance a critical precondition to generate a forward-looking land use vision (Cervero 1998, Mu and de Jong 2012). Second, interactive networks are seen as important instruments for the aggregation of information (Kooiman 1993:4, Scarpf 19990:20). The actors from transport and land use departments often have a deep knowledge that is relevant for urban planning, and when the knowledge of all the affected actors is added up, it represents an important basis for making a more "intelligent" choice among various development plans. Third, interactive networks are platforms for consensus building or for the civilizing of conflicts among stakeholders (Mayntz 1993:17, March and Olsen 1995:27). And fourth, interactive networks are supposed to reduce the risk of implementation resistance (Sorensen and Torfing 2003:614). If actors from transport and land use planning departments are involved in the decision-making process they will tend to develop a sense of joint responsibility and ownership for the decisions and this will oblige them to support and mobilize resources for the implementation.

Now, the problem is that these potential gains can only be fully realized in effective governance networks. Changes in the composition of the actors, the presence of unresolved conflicts, frustration over the lack of clear and visible outcomes, power asymmetries and external events that disturb the policy process can destabilize governance networks and turn them into talking shops (McGuire and Agranoff 2011). Then, what factors constitute an effective governance network? When answering this question, we should avoid defining and measuring effective governance network as we do for the hierarchical and the market approaches. Effective hierarchical control is defined as the ability to transform substantial values and majoritarian decisions into standardized policy outputs; and when it comes to market governance, effectiveness refers to the ability to provide low cost Pareto-optimal solutions with procedures ensuring perfect competition. This provides an unfair yardstick for measuring the effectiveness of governance network since the network approach is to formulate and implement public policy through negotiated interaction that emphasizes resource transformation and preference communication, and that stresses providing satisfying rather than optimizing solutions. However, they are not completely irrelevant. It is clearly a problem for governance network when it fails to reach some collective decisions, or when it produces joint solutions that are either too costly or tend to shift the costs of the benefits obtained by the network actors to external groups or even the citizens.

Based on this principal and working on a range of empirical studies with a theoretical background in network governance (public education networks see Meier and

O'Toole 2001, 2003; healthcare networks see Provan and Milward 1995, Proven and Sebastian 1998, Zheng et al. 2010; family and children services see Page 2003; local/urban development networks see Agranoff and McGuire 2003, Blanco 2015; welfare service delivery see Menahem and Stein 2012; public transport governance network see Hansson 2013), **resource pooling, mutual trust, horizontal coordination, equal power distribution, openness of network and metagovernance** are believed to be the main factors contributing to a successful governance network and facilitating policy integration.

- **Resource Pooling**

One theoretical root of the network governance approach is interdependency theory. Interdependency theory views interactive networks as process of interest mediation between a number of autonomous actors who are relevant and affected by a policy issue and mutually dependent on each others resources for utility maximization. Therefore, effective governance networks require that the network actors are willing to share all their resources such as knowledge, experience, formal authority, political competence, organizational capacity and financial strength. It follows that one of the criteria for assessing the success of governance networks is their capacity for joint problem solving through negotiated exchange of resources.

- **Mutual Trust**

The network actors operate in an uncertain social and political terrain, where they cannot be sure how the other actors will response to their actions and thus always need to take precautions against others opportunistic behavior. This uncertainty will then prevent resource sharing due to the emergence of defensive, non-cooperative strategies. However, this problem can be overcome by the development of trust, which is defined as the stable perception of an actor that another actor will abstain from opportunistic or non-cooperative behavior. A high degree of mutual trust is developed over long-term concrete experiences with social and political interaction with particular actors and over time it might be developed into a general accepted norm and behavior standard. If this happens in a governance network, then resource pooling will be facilitated and an effective governance network will be highly likely to emerge.

- **Horizontal Coordination**

Seen from the governability theory, governance networks are relative institutionalized arena for horizontal coordination between various relevant governmental departments (Mayntz 1993, Kooiman 1993, Scharpf 1994, 1997). In modern society, functional differentiation of government organizations in pursuit of specialization of work and explicit division of responsibility results in a growing fragmentation of social and political actors. However, this can be restored by forming crosscutting governance networks that promote inter-organizational coordination. According to Sorensen and Longva (2011), coordination in network governance has four typologies: organizational coordination where increased coordination is obtained through

changing organizational structure by remerging organizations, forming new joint organizations and adapting outdated organizations; contractual coordination where contracts are applied to improve coordination; partnership coordination where interdependent actors establish partnerships; and discursive coordination which refers to measures that aim to shape positive images of the actors and the coordination process itself.

- **Equal Power Distribution**

Less often mentioned but equally important is the equal power distribution within networks as one of the essential preconditions for effective governance networks (Agranoff and McGuire 2001). Rhodes (1997)'s study of transformation of government argues that network actors are usually controlled by dominant coalitions, employing strategies within the rules of the game to regulate the process of resource exchange and interaction. In a similar vein, Klijn and Skelcher (2007:598) refer to this situation as the "instrumental conjecture" on networks, that powerful governmental actors increase their capacity to shape and deliver public policy in a complex world through the instrumental use of networks.

- **Openness of Network**

Another crucial requirement for successful policy integration is the openness of the network. Formulating a satisfactory solution to uncertain, complex and basically wicked policy problems requires that all the relevant and affected actors are involved in the network-based negotiations. That means, an effective governance network is in need of a high degree of openness. However, sometimes the inclusion or the participation of relevant actors might be hampered by different forms of network closedness (Schaap and van Twist 1997). First, the rules and procedures in use may exclude certain actors from accessing to the governance network. Second, even thought the network actors realize that some of the relevant actors are excluded, they are unwilling to change the network configuration or to remove the barriers for access because of the vested interests. Third, in spite of opening up the closed and exclusive governance network, some policy actors may choose not to participate, either due to the fear for losing their autonomy and identity, or because they are so big and powerful that they will gain little from mutual exchange of resources with others.

- **Metagovernance**

Resource pooling, mutual trust, horizontal coordination, power distribution and openness of network do not necessarily lead to the formation and operation of an effective governance network. The development of institutional rules and processing procedures that enables the relatively autonomous actors to recognize their interdependency and act upon it is extremely crucial. In network governance theory, scholars call this institutionalization process metagovernance: the shaping and the adjustment of network rules in order to guide or to facilitate interactions between actors. Klijn and Koppenjan (2004) provide us with three types of strategy for metagovernance: first, strategies aimed at network composition, such as consolidating

or changing the actors' positions, adding new actors, and changing the access rules for actors; second, strategies aimed at network outcomes including changing the pay-off structure (financial or other rewards that are connected to strategies and decisions) and the evaluation criteria and standards by which the actors judge the outcomes; and third, strategies aimed at network interactions, foe instance, establishing linkages between actors, introducing conflict-settlement mechanisms and attaching actors with certification showing the characteristics of an actor or its relation to others.

Although the debate on network governance is a novel field and in recent years has erupted vigorously both theoretically and empirically, to our knowledge, this is rooted in Western experience. The way policy-makers and planners interact and negotiate in countries with different administrative and political contexts than Western societies have received relatively scant attention. How can this Western-based network governance theory be applied to the Chinese policy-making context? And what can we say about land use and transport integration in China? To answer these questions, we will report on the evidence on transport-land use integrated planning and policy-making we collected in Urumqi, while keeping the six subsets of preconditions in the back of our minds. But before that, we first clarify our data sources and data analysis in the following part.

3. Data and Method

Much of China's accelerated urbanization and motorization has taken place in economically advanced regions of the East Coast. However, less is known of the urban development, urban transport and land use planning in particular, in West China, part of the nation's vast hinterland. Due to the limited data and inconspicuous economic achievement, little literature has been found on how urban systems evolves in this region. In the following section we illustrate and elaborate the governance network theory presented in the above section for the case of integrated planning for transport and land use in Urumqi. We relied on a combination of in-depth interviews and the information obtained from internally published articles, reports, academic articles, media news and government documents on urban planning and transport management in Urumqi. This source of data and combination of research methods greatly helped in enriching our interpretation of the interviewee's narratives and allowed us as researchers to obtain a better understanding of how planners and policy makers in West China are working.

To obtain a diversity of views on the practice of transport and land use planning in Urumqi, we spoke with planners, experts and policy makers at different levels of government and with different positions and responsibilities in urban planning, transport planning and management in Urumqi. We interviewed policy makers from Planning and Design Management Center of Transport Department of Xinjiang Uygur Autonomous Region, who are in charge of transport planning and urban transport infrastructure management in Xinjiang as well as in Urumqi. We also spoke with planners and experts in land use planning and urban design from Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences, who are well knowledged

with the evolutionary pathways of urban development in Urumqi and shared many insights and internal materials with us. To obtain insights on Urumqi's metro planning and decision-making process, we interviewed with two experts from Urumqi Rail Transit Office. In addition, we talked with policy makers from Xinjiang Department of Science and Technology, who are researching on Urumqi's human geography. Furthermore, to obtain information on how decisions were made by the public enterprises when migrated to Urumqi, we interviewed people from Xinjiang Petroleum Co. and Xinjiang Engineering and Research Institute of Nonferrous Metals Co. Ltd. Furthermore, to investigate how Urumqi's transport and land use planning is different from other cities in China, we interviewed public officials from the Ministry of Transport and the Ministry of Construction in Beijing.

The interviews ranged in length between 45 and 60 min and were conducted in the interviewees' offices and through online chatting. Later, in data processing and analysis phase supplementary data and further information were inquired through phone calls. During the interviews, we first explained the network governance theory to them and presented the six conditions for an effective governance network to check how they saw Urumqi's records according to each condition. Since the concepts in network governance theory are theory-based and unknown to the practitioners in Urumqi, we abandoned the use of these theoretical concepts and asked some open questions. Therefore, we have to emphasize here that in the end it is our reconstruction of events past and present, extracting the useful information and evidences from interviews, mapping them to the six conditions and investigating the changes in Urumqi's integration level of transport and land use. Below we report and reflect on the analysis, using a selection of quotes that are representative of interviewees' understanding and experiences to illustrate certain events and issues aptly and vividly.

4. Urumqi's Record in Transport-Land Use Integration

Urumqi, as the capital of Xinjiang Uyghur Autonomous Regions of China, was a major hub on the Silk Road in ancient times and is now developing its reputation as a leading industrial, commercial and cultural center in Northwest China. In 2014, the city has a total administrative area of 15173 km^2, including 412 km^2 of urban area with seven districts (Tianshan, Saybark, Shuimogou, Xinshi, Midong, Toutunhe and Dabancheng, see figure 1) and one county (Urumqi county), together housing a population of 3.53 million and 48 ethnic minorities (Urumqi Statistics Bureau 2014). In recent years, Urumqi has enjoyed a continuous economic growth: the city's GDP registered a 4.5% increase in 2014, reaching 251 billion RMB and ranking the first in terms of economic prosperity in West China (China Statistical Yearbook 2014). In Guinness Book of Records, Urumqi has earned a place as the most remote city from any sea in the world. Being ringed on three sides by Tianshan Mountains and one side by Changji (a city to the north of Urumqi), the city's expansion is geographically restricted and thus the built-up areas of Urumqi is characterized by an extremely high density of population (8568 persons/km^2).

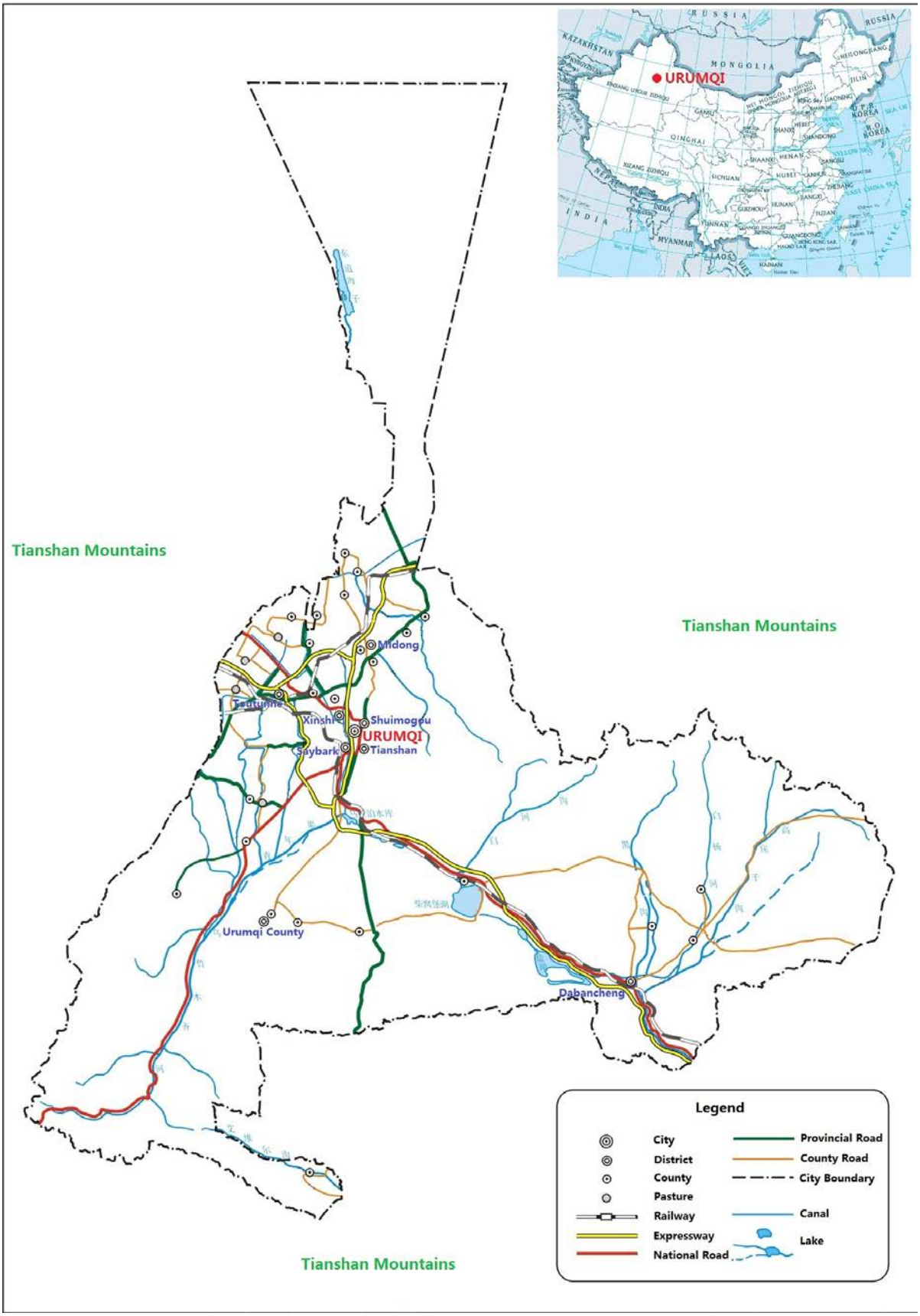

Figure 1: Urumqi geographic location (source: adapted map from Xinjiang Bureau of Surveying Mapping and Geoinformation, www.xjch.gov.cn)

4.1 *Danwei* Migration and Adhocracy

Before 1949, there was hardly any infrastructure investment in Urumqi and the area located just off the main Silk Road was only seasonally inhabited and used for pastureland by several different nomadic peoples. After the foundation of China, Urumqi was rapidly gaining importance to the national government due to its geographical position where China may open the window to the outside world in Northwest and become a center of gravity between Europe, the Middle East and Central Asia. Because of this, under the planning economy, China adopted a *Danwei*[1] approach to the development of Urumqi. The *Danwei* approach designed for a high density and mixed functions of land use. Figure 2 shows Xinjiang Petroleum Co. as a *Danwei* illustration. Apart from salary, *Danwei* not only provided the Han immigrants with a comprehensive package of welfare and services including medical and educational facilities such as clinics, kindergartens and schools, daily life facilities such as dining halls, bathing houses, sports fields, playgrounds and retail shops. Most importantly, *Danwei* also assumed the full responsibility of housing provision for its employees. This system left the migrants no choice but to live in houses allocated by their affiliation and adjacent to workspaces. Therefore, the *Danwei* communities were self-sufficient areas of concentrated activity; trans-*Danwei* traffic demand was rare; commuting was usually short-distance traffic and thus walking and bicycling represented the basic and ubiquitous modes of travel in Urumqi.

From its humble beginnings as a canyon, the new town construction in Urumqi marked a high level of transport-land use integration. However, how was the integration effected in and between these *Danwei* projects? And how was the governance network functioning among the multiple affected actors?

Openness of Network

Apparently, none of the single authority or the public-owned enterprise was capable of the “sophisticated” process of industrial migration, the kind required of a consensus-oriented mode of coordination and a mood of optimism in terms of the relocation to a remote, arid and unfamiliar place. In 1956, the State Planning Commission (the predecessor of the National Development and Reform Commission), appointed by the State Council, initiated a “pep rally” to motivate nationwide industrial migration. Any voluntary enterprises were encouraged and accepted to join into the network and thus the level of openness was remarkably high. The new organizations in Urumqi could take several forms: it can be newly established enterprises, branches of the original enterprises in inner lands, or the whole enterprises relocated to Urumqi. During 1956-1975, the first wave of migration took place among more than 10 industrial sectors (such as electric power, coal, metallurgy, agricultural machinery, textile, paper-making, food production, culture，education and medical care) and some 200 thousand Han workers as well as their families from inner lands (Huang 2011). For example, the People’s Liberation Army (PLA) stationed in Xinjiang initiated and established the new Bayi Steel Corporation, and

[1] *Danwei* (or work unit) is a generic term denoting the socialist working place in China.

another public enterprise, Tianjin Cotton Textile Mill, established a new branch in Urumqi. Consequently, a series of new organizations were built up[2], which gradually became the primary momentum of urbanization and economic growth in Urumqi. In 1958, the urban area of Urumqi enlarged from 81.3 km^2 to 640 km^2 (Dong, Zhang, et al. 2006).

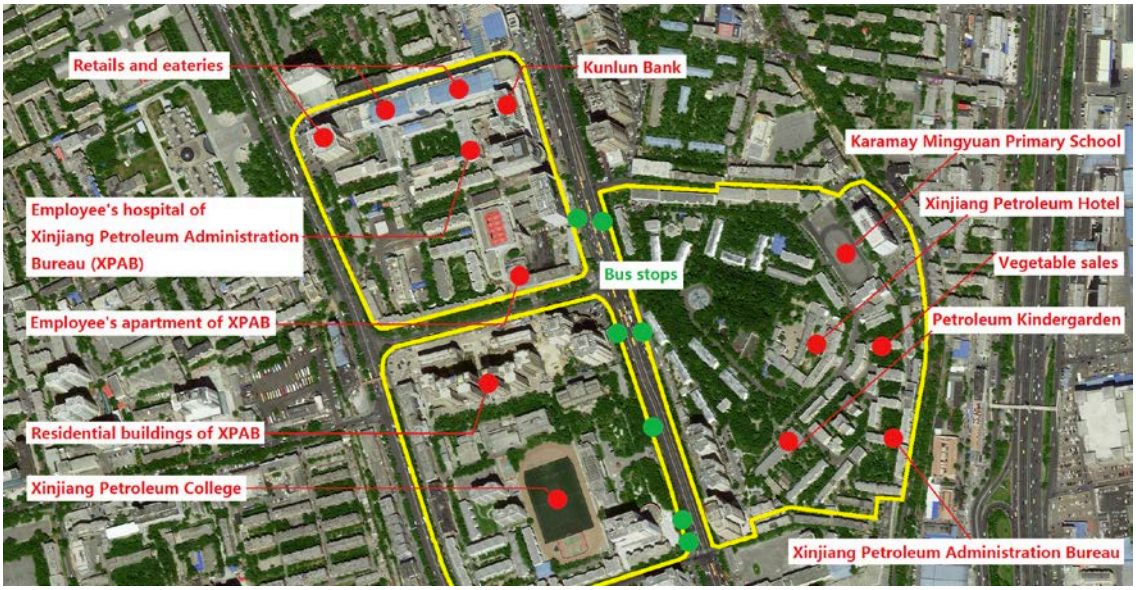

Figure 2: *Danwei* legacy of Xinjiang Petroleum Co.

Horizontal Coordination

Only a high level of network openness is insufficient for the achievement of large-scale industrial migration and the integrated pattern of transport and land use. Network actors have to form a stable coordination mechanism and channels of information communication. As such, the State Planning Commission (SPC) allied with other national authorities (mainly including the State Urban Construction Bureau (SUCB) that is now the Ministry of Housing and Urban-Rural Development of China; the Ministry of Finance (MoF); the Ministry of Transportation (MoT)), as well as the liaison persons from the joint enterprises, to establish an ad-hoc organization. The adhocracy, with the structure shown in figure 3, worked in the following way: (1) the deputies from SUCB and MoT and the liaison head from the chosen *Danwei* formed into an ad-hoc network, within which the land use and transport plan for the *Danwei* was made according to the number of migrants and production demand; (2) the plans from each ad-hoc network were synthesized by the deputies at the national level; (3) following the criteria of output value and pollution level of each *Danwei*, the SPC, SUCB and MoT distributed land parcels in different locations to *Danwei* and designed transportation routes; (4) based on the overall land use and transport plans, the MoF appropriated public money to the SUCB and the MoT for civil works.

[2] During 1956-1965, the newly established organizations, for instance, include Bayi Steel Corporation, Shiyue Automobile Repair Plant, Liudaowan Mines, Qiyi Cotton Mill， Urumqi Agricultural Machinery Factory, Urumqi Wireless Power Plant, Tianshan Food Factory, primary and middle schools, universities, Xinjiang Press, Xinhua Bookstore, hospitals as well as the administrative departments such as Urumqi municipal and district governments, Xinjiang Education Bureau and Xinjiang Agricultural Bureau, etc.

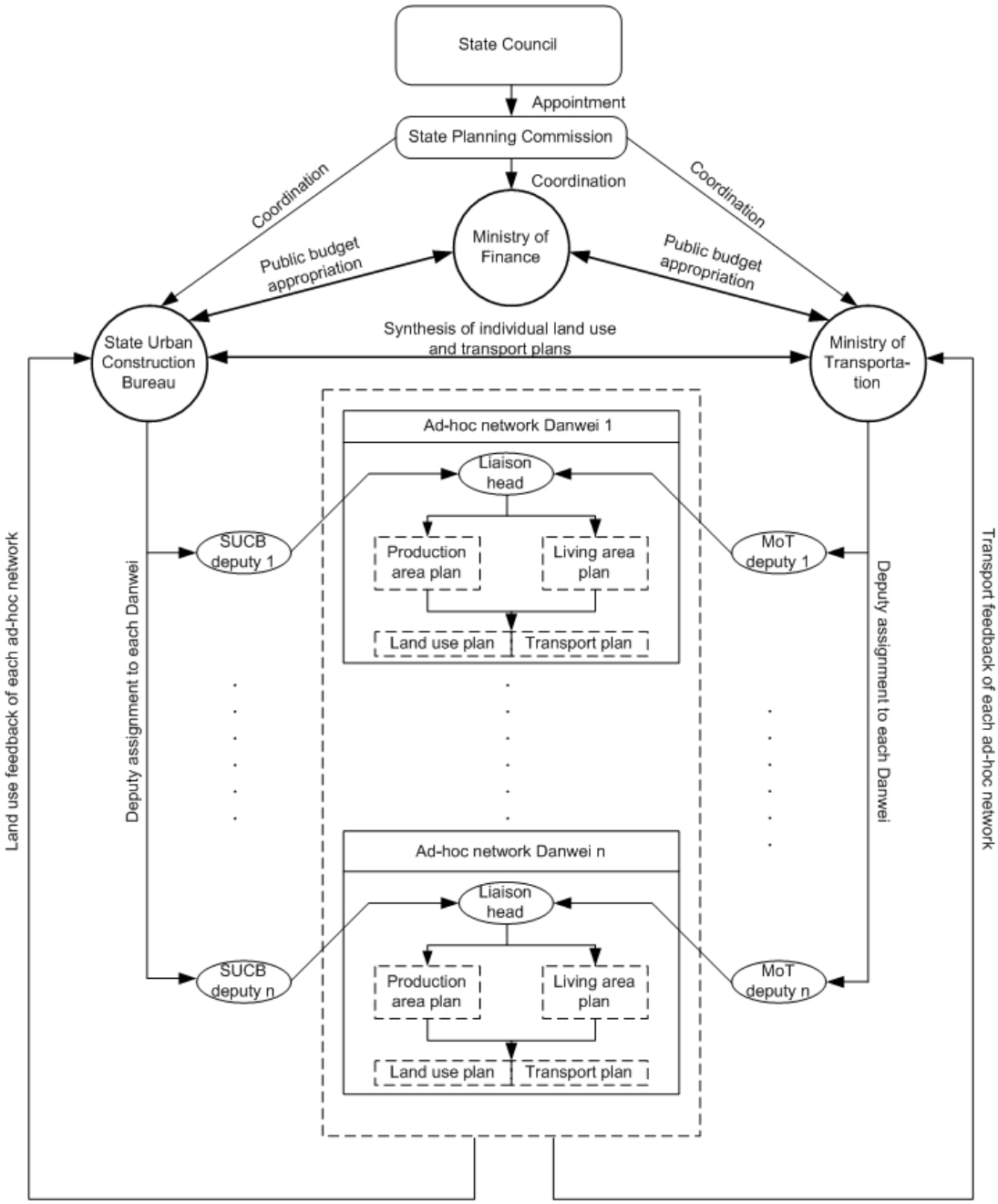

Figure 3: Adhocracy of transport-land use planning in Urumqi

Resource Pooling

Network actors also have to inject their resources or exchange resources in order to jointly solve the problem. In the *Danwei* programme, the national governments provided formal authority for the migration. The SUCB justified the transformation of land use from agricultural cultivation to industrial production and granted land use rights to the enterprises. The MoT devoted many experts in traffic engineering to design the road network and build the pedestrian streets. And the MoF appropriated national budgets to the development of *Danwei* neighborhood. According to Dong and Zhang (2011), Urumqi received more than 15 billion RMB during 1956-1965 from the MoF. Besides, it has been a constant struggle to build suitable human residences

and production activities in Xinjiang due to the harsh environment, in particular the water resources that are dependent on glacial melt and limited rainfall (Xie, Ward, et al. 2007). Facing this challenge, the national government put extra efforts in developing groundwater resources and maintaining the Karez[3] system. In addition, the national government sent Production and Construction Corps to Xinjiang, totally 100 thousand people, with the responsibility of farmland reclamation, railway, road and bridge construction and other urban infrastructure construction such as sewage system. It is worth mentioning that the railway linking Urumqi and Lanzhou opened to traffic in 1965. On the enterprise side, they invested human resources and technologies to Urumqi and contributed remarkable industrial output value to the region. From 1952 to 1965, Urumqi's GDP increased from 76 billion to 384 billion RMB.

Mutual Trust

The high degree of willingness of resource pooling was originated from a high level of mutual trust in socialist China. Research by Mu, de Jong et al. (2015) shows that a socialist working style shaped employee's taken-for-granted commitment to serving the state and their affiliations. This principle cultivated people's loyalty to the country. People always considered the general people's interests and held a high level of altruism and mutual trust. This is further verified by Bergh and Bjornskov (2014), in which a socialist paradigm with egalitarianism as core value and income equality will lead to a trusty society and strong cooperative desire. In addition, a few scholars conclude that the Chinese people sharing the same Confucianism values promote a high trust level at a whole (Shi 2001, Yang and Tang 2010).

Equal Power Distribution

The top-down and command-and-control approach during China's planning economy witnessed an unequal power distribution in the governance network. In spite of the formation of the adhocracy, enterprise actors are controlled by the state authorities that possessed the dominant positions within the network to regulate and finance (in terms of both budget and land allocation) the industry migration. People might see the establishment of the ad-hoc organization as a hegemonic apparatus of the central government to achieve successful migration. However, other conjectures demonstrate that power asymmetry can be viewed as a force to facilitate network processes. As a momentum force, network actors with stronger and more resource-based influential power may play a decisive role in pushing policy process moving forward when the negotiation falls into stalemate (Zheng, de Jong et al. 2010, de Jong, Mu et al. 2010).

Metagovernance

The performance of network governance in terms of metagovernance is mixed in the *Danwei* programme. On the positive end, complex processes of industry migration

[3] The Karez system is a series of well-like vertical shafts, connected by gently sloping tunnels. Karez, utilizing groundwater resources, creates a reliable supply of water for human settlements and irrigation in hot and arid climates.

delivered satisfying outcomes since the network was based upon well-designed ad-hoc structure and organizational guidelines (a process design) for interactions (see the part of horizontal coordination). On the negative end, it was almost like a blank paper for the institutional structure and legislation to ensure integrated transport-land use planning, partly due to the short period after the foundation of the country and thus institutional building simply not on the political agenda. In addition, interactions between actors were mainly dependent on the high level of trust, resource pooling and strong sense of cooperation we discussed above, strategies and rules concerning conflict-settlement mechanisms (to regulate conflicts between actors) and strategies such an certification (standards of quality attached to the characteristics of an actor or his relation to other actors) were still missing.

To sum up at this point, the early development period of Urumqi, which was featured by large scale Han migration and *Danwei* establishment, marked a high level of transport-land use integration. Looking at this integration from the network governance theory, we found that it presented good records in the openness of network, resource pooling, horizontal coordination and a high level of mutual trust. Concerning equal power distribution, the network's performance was varied. Nevertheless, the national authorities strong position in the network instead became the momentum and facilitated network interactions. As for metagovernment, its performance is mixed, with strong efforts in process design while ignoring institutional building.

4.2 Transit-Oriented Development and Public-Private Partnership

Although after the 1980s the force of land reforms and marketization of the provision of residential houses began to act on the city, Urumqi's legacy of *Danwei* provides advantages for developing an integrated transport and land use landscape. Research by Zhang, Lei et al. (2012) shows that the spatial distribution of population with different occupations is congruent with the land use distribution of different functions (see figure 4). That means most of the people in Urumqi are still living near to their institutes and companies. Therefore, following many cities in coastal areas such as Dalian, Shanghai, Nanjing, Shenzhen and Guangzhou, Urumqi also announced the introduction of Transit-Oriented Development[4] (TOD) in 2011.

[4] A detailed study on the concept of Transit-Oriented Development can be found in Mu and de Jong (2012) Establishing the conditions for effective transit-oriented development in China: the case of Dalian. Journal of Transport Geography, 24(Sep.), 234-249.

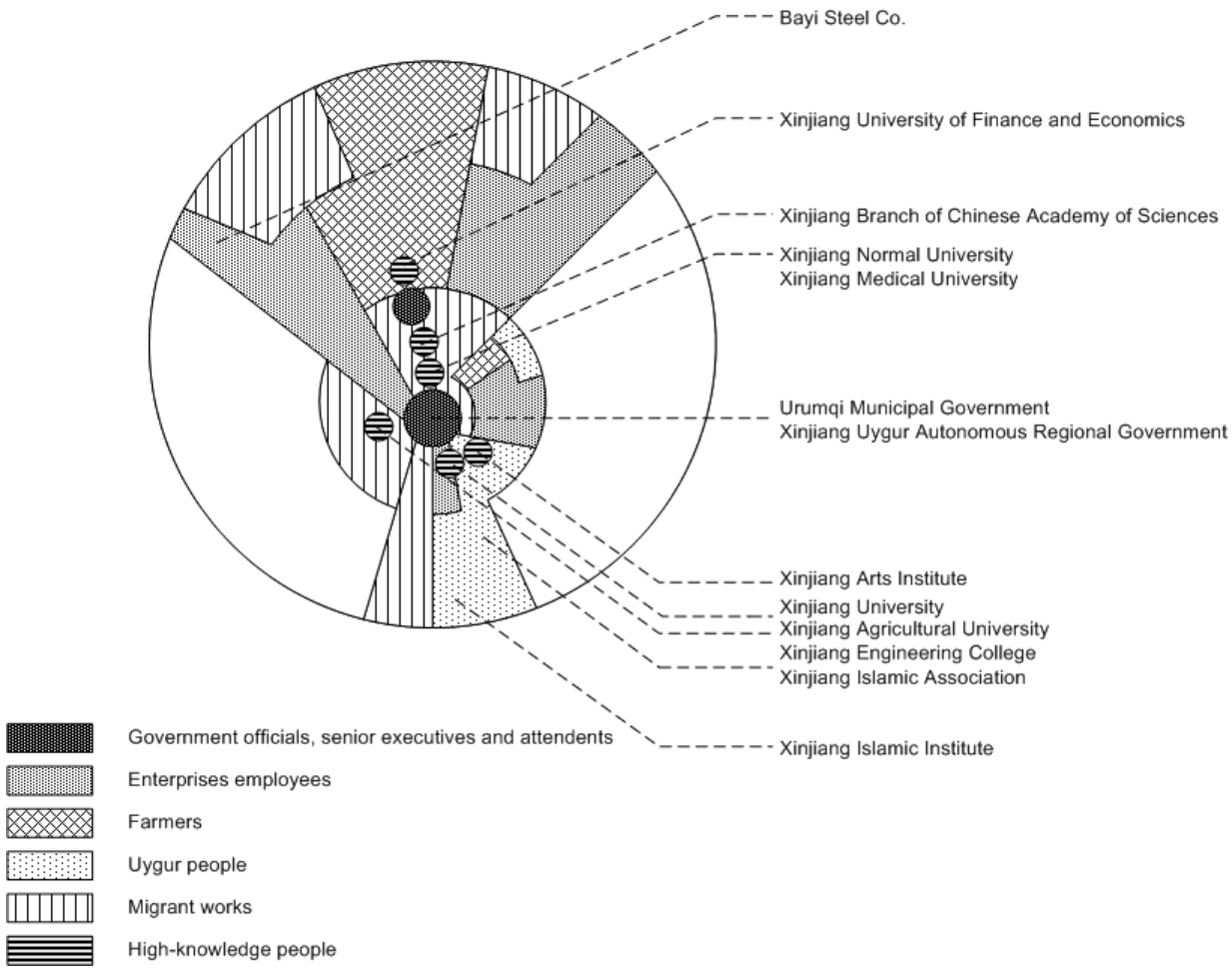

Figure 4: Spatial distribution of social areas in Urumqi, 2011
(Adapted from: Zhang, Lei et al. 2012)

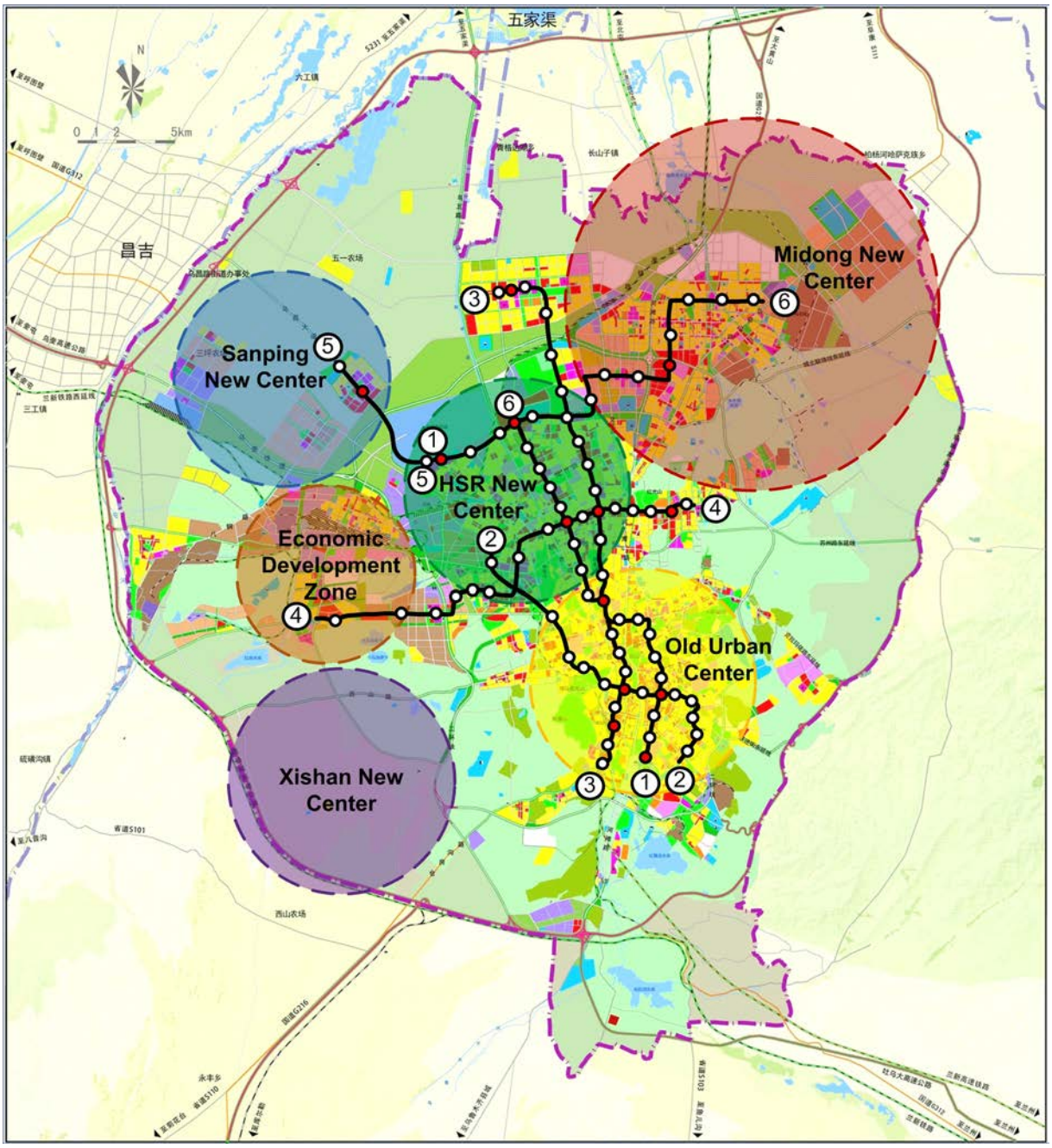

Figure 5: Urumqi Urban Master Plan, 2011-2020
(Adapted map from Urumqi Urban Planning and Design Institute)

In the same year, Urumqi released a new Urban Master Plan (2011-2020), which is composed of a land use plan and a special plan for urban rail transit (figure 5). In the land use plan, Urumqi will transform from a single-center (old urban center) to a multi-center layout (Sanping, Midong, HSR, Xishan new centers and the Economic Development Zone). It explains that a single-centered city is often criticized for having too high a traffic density in the old urban core, and the concentration of offices and commercial activities has generated intensive vehicle trips that cannot be handled simply by expanding road networks. The transport implications of a multi-centered city would theoretically be positive to reduce the traffic density around the city core

through dispersing the trips to other urban centers. In addition, it designates that each center should reflect a certain degree of self-sufficiency and has its own industrial or economic base as the distinctive identity. As planned, Urumqi's old urban center will retain its status as an administrative, commercial, financial and cultural center. For Midong New Center, however, a large population of the land is assembled for polluting industries and storage area, while a small amount of land is used for residential purposes for the workers of the industrial enterprises. In this center, industrial activities are focused on oil refining, petrochemical engineering and coal production. Regarding the Sanping New Center where the Baiyi Steel Co. is located, a large area is built into iron and steel industrial base. The HSR New Center is newly adaptive area after the advent of high-speed rails in Urumqi. In this center, the railway stations will be enlarged and renovated, and a large area surrounding the stations are allocated for cargo storage and oil depot. Different from other centers and near to the airport, the Economic Development Zone accommodates various international joint ventures and focuses on national export processing activities. As for the Xishan New Center, it is relatively a long-term planning target for residential zone, with the purpose to disperse crowd in old urban center.

The urban transit plan, on the other hand, resonates with the land use plan in a highly integrated way. It consists of 151.2 km rail-based transit lines passing through the centers. The first line and the second line are backbone running from south to north with a length of 27.6 km and 21.4 km respectively, connecting the old city center with the HSR center. The third line also runs from south to north, but goes beyond the HSR center to the Midong industrial zone. Lines four to six are horizontal lines from west to east, connecting the economic development zone to the Midong industrial area, the HSR center (the airport) to the Sanping center and further to the Midong area. Rail transit from other centers to Xishan New Center is currently missing and is on the long-term planning agenda. Now the first line is under construction and the second line and the fourth line will start construction in 2016, with an investment of 30 billion RMB.

Therefore, it can be seen that the new urban master plan indeed plays a big role in inheriting the high integration level of land use and transport in Urumqi. The multi-centered layout and the planned rapid rail system will become the principle device to achieve Urumqi's vision of transit-served new center development. Such a co-development therefore set the stage for a powerful transport-land use nexus. When looking from the network governance theory:

Openness of Network

The massive plan of the metro system in Urumqi requires huge amount of capital. Although the central government of China provides substantial funds for urban construction in Xinjiang, Urumqi's municipal government has begun to open the governance network and consider wider sources of project financing. Therefore, in early 2012 when the first metro line was still at the preparation stage, the municipal

government announced to introduce Public-Private Partnership (PPP)[5] as an alternative form of funding. In late 2012 Urumqi Construction Committee published a formal open bid invitation in a very transparent way on the website of Urumqi Construction Engineering Information[6] (http://www.wsgcjy.com/). In the bidding announcement, it clearly stated that nationwide design and construction enterprises, both public and privately owned, that meet the qualification requirements are accepted as potential contractors. Due to the high degree of openness, the Committee received almost one hundred tenders and finally through qualification examination and bid evaluation 19 public and private enterprises were selected as contractors, each in charge of one rail section's design and construction responsibilities.

Horizontal Coordination

Coordination during the *Danwei* period was accomplished through the establishment of an ad-hoc network, while it is achieved in the TOD period through introducing PPP and formulating contracts. Figure 6[7] shows the contract relationships between different actors in Urumqi metro line 1. Two SoEs, Urumqi Urban Rail Group Co., Ltd. (UURG) and Beijing Metro Operation Company (BMOC) were selected by Urumqi municipal government, the first as constructor and the second as operator and manager. UURG and BMOC have a turnkey relationship. Once the project is finished it is transferred from UURG to BMOC for operation. During operation, BMOC receives subsidies from Urumqi municipal government. With governmental guarantees, banks signed loan agreement to the constructor and provided 60% of the entire project investment. In addition, the main constructor UURG signed subcontracts with the 19 construction and engineering companies, as well as some facility suppliers[8].

[5] A detailed study on the concept of Public Private Partnership can be found in Mu, de Jong and ten Heuvelhof (2010), De Jong, Mu, et al. (2010), and Mu, de Jong and Koppenjan (2011).
[6] Information is obtained from China Rail Transit Website (http://www.rail-transit.com/Detail_Bid.aspx?ID=12938).
[7] Figure 6 is drawn according to the information obtained from interview with the director of Urumqi Rail Transit Office, and from Tianshan Website: http://news.ts.cn/content/2014-03/20/content_9459824.htm.
[8] Information is obtained from Tianshan Website (http://news.ts.cn/content/2014-03/20/content_9457144.htm and http://news.ts.cn/content/2014-03/20/content_9459824_2.htm).

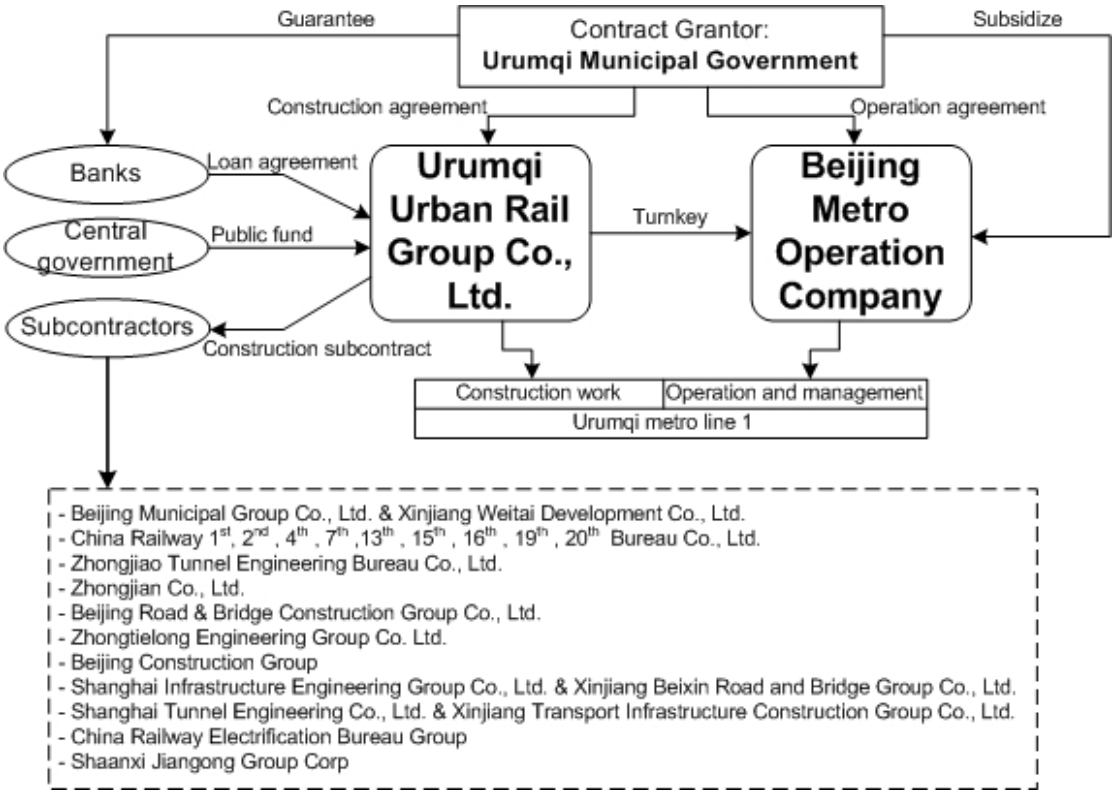

Figure 6: Contract structure of Urumqi metro line 1

Resource Pooling

People may wonder why the municipal government of Urumqi selected Beijing Metro Operation Company as the operator. The reason can be traced back to the "Beijing-Support-Xinjiang" Programme[9], in which cadres from various governmental departments and state-owned enterprises in Beijing went to Xinjiang to co-work with the congener organizations for one or two years and seek for cooperative projects and policies. For instance, in 2015, 1065 cooperative projects were planned between Xinjiang and 19 cities from East China, the total investment amounting to 11.375 billion RMB[10]. And Urumqi's metro plan was the achievement of this kind of cooperation in 2011[11]. In addition to the continuous pooling of human resources, the central government has been implementing Western China Development Plan since 2001, and provided substantial funds for infrastructure development in West cities. Under this strategy, the central government appropriated 0.5 billion RMB (3% of the total investment) to the construction of metro line 1 in Urumqi, which is rare in metro projects in other cities except for those with significant political meanings or serving for international sport games.

[9] The "Beijing-Support-Xinjiang" Programme is a constituent part in the big national project of supporting Xinjiang that was initiated by the central government and in which nationwide provinces and cities devote high knowledge people, experts and technologies to Xinjiang, and in most circumstances seek for cooperation opportunities between Xinjiang cities and those outside Xinjiang.

[10] The information is obtained from Xinjiang Broadcasting Station: http://www.xjbs.com.cn/news/2015-04/08/cms1757978article.shtml?nodes=_370_551_.

[11] The information is obtained from interview with the director of Urumqi Rail Transit Office, and from "Beijing-Support-Xinjiang" Website: http://yjw.qianlong.com/.

Mutual Trust

In spite of the achievement of the integrated plan for rail transit and land use, the trust level in the urban governance network of Urumqi has been diminished due to several bombing and violent terrorist attacks over the past five years. Political and decision-making atmosphere therefrom became extremely sensitive; any move or action by policy makers was cautious. Consequently, informal coordination and communication between planners and decision-makers from different governmental departments became less frequent, and the affected actors had to resort to formal channels of information exchange. According to the interviews, transit planners acquiring land use information from urban planning institute need to apply for permission throughout different levels of bureaucracy and show formal letters of cooperation request. It also requires serious examination before the information can make known to other departments or be published to the public. Therefore, trust is a "weak tie" in this period that could sustain the governance network. The integrated transport and land use planning is less efficient than that in the *Danwei* period.

Equal Power Distribution

One of the optimistic claims from network governance is that it has the potential to enhance equality. Accordingly, although the trust level fell in Urumqi's governance, the degree of equal power distribution increased partly due to the high level of network openness and partly due to power devolution from the central government and functional specification of governmental organizations. First, as described above, participation to the PPP network is open and widespread, something even close to full participation by all qualified enterprises. This high level of network openness thus gives rise to an equal power of network entry or accessibility. Second, along with the deepening of the national decentralization reform, Urumqi gained autonomy in political, administrative and fiscal affairs; the state command-and-control and top-down approach is absent; urban planning and design institutes, including Urumqi Transportation Bureau, Urumqi Rail Transit Office and Urumqi Land Resources Bureau, are parallel organizations with equal administrative level.

Metagovernance

Metagovernance in this period mainly concerns on the retainance of an umbrella organization and the establishment of new policy measures to clarify the pay-off structure of the affected actors. First, different from many capital cities like Beijing, Shanghai and Guangzhou where transport and land use planning and management bureaus are separated organizations and sector silo behaviors are highly likely to emerge, Urumqi adopts the "Grand Construction Committee" paradigm to urban planning and development. That means, Urumqi Construction Committee that was established soon after the foundation of the country was not abolished along with the trend of functional specification and jurisdictional division in governmental departments, and retained as an umbrella organization aiming at establishing linkages

between actors and facilitating inter-organizational cooperation.[12] Second, after introducing the metro program, Urumqi launched the Administrative Measure for Rail Transit Fund, in which the subsidy mechanism and operation performance evaluation methods are shaped based on negotiations between the municipal government and Beijing Metro Operation Company. Therefore, this new measure plays a role in establishing the pay-off structure of the involved actors and also the way in which actors may judge the outcome.[13]

5. Conclusions

In this article we took up the challenge of applying network governance theory to understand the integrated planning and management process of urban transport and land use in Urumqi. We synthesis the leading literature regarding network governance to build up a six-dimensional network assessment framework, which provides a method to excavate the merits and problems/limits of the urban governance network. However, to answer the research question, it is important to realize that there are substantial regional differences in China. The urban planning and management network of Urumqi, a city with fragile physical environment and complex ethnic mix, can be quite distinctive from other cities, especially the coastal ones in East China. However, representing cities in West China, or those on the He-Xi Corridor, or even second-tier cities in other provinces, more can be said when looking at Urumqi's empirical findings with the help of those six indicators, and we can sketch the following features of the administrative system in urban governance in China.

Most surprisingly, the level of network openness in Urumqi was high both in the *Danwei* and the TOD planning periods. However, we could realize that the city governors open the network because they lacked resources for some huge urban plans, in Urumqi's case, the first due to the need of recruiting participants in industrial migration and the second driven by the lack of financing resources for rail transit projects. As many scholars have recognized, city managers normally only conditionally open the governance network (Taylor 2007, Davies and Pill 2012). In many social management arenas, officials find collaboration difficult, and are actually increasingly forced to withdraw from network outreach. Therefore, creeping managerialism becomes prevail and in fact closure around the congruent interests of powerful groups might be a precondition of sustainable networking (Stone 2004, Davies 2007).

Coordination also went well in the case of Urumqi. From adhocracy to public-private partnership, it demonstrates the transformation of paradigm in urban planning and public service delivery. Traditionally, China has little experience in allowing private money in public infrastructure projects. Currently, in many expressways and urban metro projects can public-private partnership be found. To reduce the burden of government debt, private capital will become the major force in financing public projects. However, to ensure an effective partnership between government

[12] The information is obtained from interview with BinHuang Zhao from Urumqi Rail Transit Office.
[13] The information is obtained from interview with Fang Dang from Urumqi Rail transit Office.

departments and the private sector, many preconditions, including legal and rule-of-law terms, checks and balances for adequate project appraisal, life cycle view, intelligence in tendering and market environment, have to be satisfied.

Regarding resource pooling, although Urumqi presents a nice record, it is noticeable that a majority of these pooled resources came from central government. This relates to the tradition of China's planning economy, under which central government usually inputs substantial resources, public budget, human and land resources, to those policies and programs accompanied by significant political and strategic meanings. Researchers even show that if public projects are attached with important national image or public security, governments usually invest at any cost, and will actively monitor project progress, since failure is out of the question (de Jong, Mu, et al. 2010).

As for trust, Urumqi's governance network in transport and land use planning has seen a decrease, partly due to the emerge of contract-based cooperation in market-led economy and partly due to the occurrence of terrorist attacks. However, there is also voice that interpersonal trust is an important network bond but cannot carry the weight of making complex urban systems function productively and effectively. Strikingly, they find that urban governance is essentially evolving away from trust relationships towards externally regulated behavior (Cook, Hardin et al. 2007:196).

Not only in Urumqi, the equality of power distribution in urban governance has increased from the command-and-control era to the power devolution in modern economy in China. Under this situation, it is undeniable that network democracy was increased, while it has also witnessed that cities shifted from collaborators from competitors. At current, scholars have pointed out that Chinese municipal governments often compete for the same resources from the central government and the campaign-style policy-making in urban government is dominant, which is lack of deliberation and sometimes even scientific cost-benefit analysis and evaluation (Liu, Lo, et al. 2015).

Metagovernance in Urumqi, as well as in other Chinese cities, is mixed. On the one hand, new laws, regulations, policy measure and instruments to ensure successful coordination and to solve conflicts between affected actors have been gradually enacted in recent years. On the other hands, strong informal personal links between network actors make the existence and effectiveness of the formal rule-of-law questionable. Scholars call this Foucauldian network governance (Davies 2011:70-71), in which metagovernance plays little role in coordinating the enrolment and regulation of subjectivities, and governance networks sometimes descend to new political rationalities.

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