

THE COMPLEXITY OF URBAN TRANSFORMATION IN CHINA: NEW TRENDS IN CURRENT TRANSITIONAL ERA

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ABSTRACT

The aim of this paper is to analyze the complexity of urban transformation in China in the post-reform era and investigate the trends toward knowledge-based society and economic shift in the global financial crisis. The paper identifies three transitional processes: decentralization and local autonomy; urbanization and urban expansion; globalization and urban restructuring. It reveals the complex urban transformation through analyzing decentralization and urban governance; urban expansion and sustainable development; marginalized population and urban social management. The paper argues that the complexity of urban transformation lie in the mismatch between fast urban development and insufficient urban planning and management. In the facet of knowledge economy and current world financial crisis, tendencies of urban transformation in this transition era are explored. The paper's analysis can provide important advice for future urban development policies.

INTRODUCTION

China has been a country of great changes, especially in its post-reform era. The shift from planned economy to a market-oriented economy has triggered substantial reform and improvement in politics and administration to meet the needs for new economic pattern. The opening-up and reform policy has made China deeply involved in the globalizing world which brought huge foreign investment and severe competition. Generally, the greatly changing socio-economic development posed huge challenges to the cities and generated much complexity to the urban transformation. Recently, the emerging knowledge economy and worldwide financial crisis present new challenges to China which is to make adjustment to a new transition era.

How did urban development react to the shift from centrally-planned economy to the market economy in the post reform and globalization era? Where does the complexity of urban transformation lie in? What are the new trends of urban transformation in the emerging knowledge economy and current worldwide financial crisis? The aim of this paper is to explore the complexity of urban transformation in China in the post-reform era and investigate the transformational trends toward knowledge economy and the current global financial crisis. Following the introduction, the second section introduces the understanding urban transformation in China. It reveals the socio-economic change in the shift from planned economy to market economy. Three driving forces and the urban transformation are also analyzed. Section three explores the complex process of urban transformation in urban governance, sustainable development and urban social management. The fourth section analyzes the new trends of urban transformation in the current transitional era based on the complexity of urban transformation.

UNDERSTANDING URBAN TRANSFORMATION IN CHINA

Although many researches have been done on urban transformation, however, it still seems to be unclear of what urban transformation is. Referring to the researches on urban land, economy, population and transportation, one common aspect is that they all focus on the changes which take place in cities. The concept of "transition" indicates a process of change toward a predetermined and conceived target (Ma, 2002). Nevertheless, it is not suitable to describe the changes in the cities which are induced by various un-artificial forces such as globalization and rural-urban migration. The term "transformation" not only avoids the inevitability of transition but also emphasizes the process of change. Besides, the transformation of cities includes economic growth change, urban population change, urban physical and environmental change as well as the social change in cities. All these changes were attributed to a combination of factors which consist of the political, economic, social and

environmental changes. In this sense, we can say that urban transformation depicts the process in which changes of urban economy, physical environment and society take place due to both internal and external forces.

Urban transformation in China has been the research focus since the 1990s (Wei, 1993; Fan, 1999; Zhu, 2000; Zhu, 2002; Wu and Huang, 2007). Wei (1993) revealed that urban land size in post-reform China is related to urban reforms, urban land use adjustment as well as to population growth and economic development. Fan (1999) identified the urban expansion in both vertical and horizontal directions. Zhu (2000) examined the influence on urban physical development based on the coexistence of market system and remaining plan factors. Zhu (2002) also explored urban development in Shanghai under the evolving property rights over urban land. Wu and Huang (2007) analyzed the new urban poverty since the broad economic restructuring and transformation of welfare provision in the 1990s. All these researches start analysis from the post-reform era in China. However, they each touched upon one aspect of urban development changes e.g. physical expansion, economy and social welfare. This section is to review the shift from planned economy to market economy and introduce the three major forces inducing urban transformation.

RIGID CENTRALLY-PLANNED ECONOMY

China has experienced two economic systems since P. R. China was founded in 1949: centrally-planned economy and market economy. The implementation and transit of economic systems were based on both domestic and international situations. Before the opening-up and reform in 1978, a centrally-planned economy was adopted by the state which installed the top-down controls of resource distribution. In this system, use and allocation of resources were strictly determined by the central government (Zhu, 2000). The central government collected the revenues generated from the local municipalities and reallocated to the localities in terms of the central plan. Local plans were suppressed due to the shortage of revenue. However, they were given clear responsibility to fulfill central plans. In consequence, many projects were implemented not based on local needs but following the planners' preference instead of the market efficiency. For instance, considering the military security, many industrial projects like steel and heavy manufacturing industries were located in middle China or those mountainous areas rather than the coastal areas of convenient transportation.

Land policy in China was based on the collectivization of land. By 1953, all privately owned land had been confiscated into collective and state ownership. The main purpose behind was to eliminate exploitation and make it effective for the allocation of land resources. Transfer of land-use rights between individuals was prohibited. In fact, price mechanism failed to work since land resources were allocated free of charge by the state to achieve a rational distribution of resources and production through planning (Zhang, 1997). Without a land market, urban land-use in China presented an inefficient structure in the years prior to the opening-up and reform. French and Hamilton (1979) argued that the absolute state ownership of urban land under strict central-control led to a dramatically different structure of socialist cities.

In the initial stage after 1949, the state gave priority to the development of city-based heavy industries so as to pursue a quick recovery from years of war. A strategy was adopted by the central government that promoted urban industries with capital-intensive technology and established a system by which government, through distorting the prices of commodities and factors of production, created an environment disfavoring agriculture, farmers and rural development to extract rural surplus to fuel industrialization (Schultz, 1978). High percent of national revenue was allocated to the productive sectors which include manufacturing and other industrial productions while less was invested in those so-called non-productive sectors like housing and infrastructure (Table1).

Table1. State investment in productive and non-productive sectors, 1953-1975 (in percentage)

Period sector	1953-1957	1958-1962	1963-1965	1966-1970	1971-1975
Productive sector	67.0	85.4	79.4	83.8	82.5
Non-productive sector	33.0	14.6	20.6	16.2	17.5

Source: National Bureau of Statistics of China (1954-1980)

With the ambition to overtake America's and Britain's leading role in industrial production, the "Great Leap Forward" (1958-1960) started. Heavy industry developed quickly in this period and attracted a large amount of rural population into cities. It is estimated that around 20 million labourers moved into cities in 1959 and 1960 while the number of cities increased greatly from 177 in 1957 to 199 in 1960. Urbanization level increased from 10.6% in 1949 to 19.7% in 1960 (National Bureau of Statistics, 1983). However, this movement caused sharp decline of arable land and the sown area which finally resulted in the great famine (1958-1961) in China (Lin, 1990). The central government had to reconsider the industrialisation policy. In this sense, policy of grain self-sufficiency emerged as a priority to greatly increase food production. The possible measure to deal with these two policies was to reduce the urban population and increase the rural population. The government called those urban graduates who could not find jobs in cities to return to their home places. Consequently, from 1961 to 1964, around 20 million urban workers and 17 million urban high school students went back to their home villages (Selden, 1992). Moreover, the state implemented the Household Registration System (*hukou* system) together with the rationing mechanisms during the late 1950s, which made rural-urban migration difficult (Chan, 1995). In this period, the urbanization rate in China correspondingly decreased from 19.7% in 1960 to 16.8% in 1963 (Su, 1999). The "Cultural Revolution" which resulted in nation-wide chaos and social, political, and economic upheaval in China started in 1966 and ended in 1976. With the intention to reduce population pressure in cities, the state launched the campaign of "up to the mountains and down to the villages" (*Shangshan Xiaxiang*). Thus, huge amount of urban youths, cadres, teachers and other professionals were forced to resettle in rural villages to receive re-education from peasants, toughen their body and purify their soul. According to Bernstein (1977) and Ma (1977), around 12-17 million urban educated youths moved to countryside in this campaign. In consequence, there was an absolute decrease in the population of the large cities with a net decrease in the total population of the city system (Yeh and Xu, 1990).

In general, the rigid centrally-planned economy in the era before 1978 was mainly based on China's backward economy. The state had to purposely concentrate the resources on the leading industry which can help recover its strength. Nevertheless, such economic system greatly influenced and limited urban development.

URBAN TRANSFORMATION IN THE POST-REFORM ERA

The opening-up and reform since 1978 marked a significant shift from centrally-planned economy to market-oriented economy in China. As Ding Xiaoping who initiated the reform remarked, China's reform is similar to "grouping for stones to cross the river" (*mozhe shitou guohe*). The declared goal of the reforms is simply "socialism with the Chinese characteristics". In this reform, centrally-planned resources distribution gradually shifted to market-oriented allocation (Aram and Wang, 1991). Local governments gained much autonomy for their own development. Land-use reform was also induced due to the emergence of the market economy. The *hukou* system which through dual social security systems artificially created the urban-rural dichotomy in China was slowly released that enabled the large scale rural residents rushing into cities for non-agricultural employment. The open-door policy and globalization brought China not only huge investment but also severe competition. All these changes contributed to the urban transformation in the post-reform era.

DECENTRALIZATION AND LOCAL AUTONOMY

Decentralization of decision-making from the central government to local authorities has been regarded as one of the influential aspects of the reform (Carson, 1997). This reform induced a shift of local government in the China's political arena: from passive agent to the central government to an active actor responsible for local prosperity (Zhu, 2000). Local governments were thus very active in local development after they were granted much autonomy in fiscal operation, financing, investment and enterprises administration (Zhang, 2002). In consequence, they try means to gain local economic growth. A common measure is to have much urban land developed for commercial or residential use due to their high revenue returns to the government. The 1979 Sino-foreign Joint Venture Enterprises Law (The Sino-foreign Joint Venture Enterprises Law, 1990) marked the start of the change of 'free' land-use (*wuchang shiyong*) policy. Until 1988, the Land Management Law of P. R. China officially reinstalled the notion of urban land as a commodity. Land-use rights which are state-owned become tradable in the market by private treaty, negotiation and auction. Thus, land sale and real estate sector became the important component for urban economy. Table2 shows the total income that was generated from urban land sale and real estate market from 1988 to 1996 in China. Through calculation, we can find that

the average annual growth rate of the revenue that was generated from urban land and real estate markets reached 32% per year since 1988. That is also why local governments are full of high enthusiasm about urban land development. In the large cities such as Beijing, Shanghai and Tianjin, the sale of land contributed to a significant portion of local revenue. The portion came to 32% and 21.2% of total local government revenue in 1995 and 1996 while the figures amounted to 29.4% and 19.3% in Shanghai, 21.2% and 9.97% in Tianjin during the same period (Li, 1999). Besides, local governments also allocate many development zones in which enterprises can enjoy tax reduction and land subsidies which are effective of attracting investment. This is usually called *zhu chao yin feng* (improve soft environment for investment).

Table2. Total revenue generated from urban land and real estate

Items Year	Total revenue	Transfer of land	Sale of commodity real estate	Rental income	others	Business taxes and charges
1988	16212.34	785.73	14721.64	88.26	616.71	--
1989	17951.14	746.80	16375.41	109.70	719.23	--
1990	21870.81	871.45	20182.63	226.10	590.63	--
1991	28403.25	1538.10	23785.97	392.21	2686.97	2055.51
1992	52855.65	4274.20	42659.38	596.17	5325.90	4144.35
1993	113590.74	8392.81	86371.41	1063.48	17763.04	9659.17
1994	128818.66	9593.57	101849.50	1728.17	15647.42	9510.29
1995	173166.24	19439.81	125828.17	2579.27	25318.99	9030.47
1996	196878.50	12033.78	153376.47	2998.99	28469.26	9277.79

Source: National Bureau of Statistics of China, 1995, 1996 and 1997

The decentralization is also embodied in the management change of State owned enterprises (SOEs). Before the reform and opening-up, SOEs, as units of the state economy, operated under central command with little autonomy. The state determined the allocation and utilization of resources through directives, rather than by pricing mechanism. The administrative allocation of laborers and redundant industrial construction led to large amount of surplus workers in the SOEs (Steinfeld, 1998; Blecher, 2002). After the reform, the state sector started to withdraw part or complete capital from many parts of the economy. SOEs began to command their own destiny in the market while the incentives that used to be political gradually became economic. The number of SOEs fell down from above 300000 in 1995 to below 150000 in 2005. Facing the competition and low efficiency, SOEs abandoned the egalitarian wage system and the administration-based job allocation. Particularly, enterprise reforms have revealed the redundant workers and hidden unemployment problems since the mid-1990s. According to China Labor Statistical Yearbook (2003), SOEs have cut off redundant jobs of 4.04 million every year from 1995 to 2002 (National Bureau of Statistics, 2004).

URBANIZATION AND URBAN EXPANSION

It has been generally understood that China has experienced accelerated urbanization due to market reforms and opening up of the socialist economy over the past two decades (Pannell, 1995; Logan, 2002). The transition from the Maoist plan-ideology into the post-Mao market economy has ushered in a new development strategy that values efficiency over equity, individual creativity over collectivism, and regional comparative advantages over defense or ideological consideration (Fan, 1995 and 1997; Lin, 1997). China has experienced dramatic economic growth in the last decades. From 1978 to 2000, China's GDP increases 7.4 times with an average growth rate of 9.6%. The inherent economic advantages and autonomy have made cities especially those alongside the coastal line flourished in the post-reform era. Cities in Eastern China became the front of connecting the international market. A great amount of foreign invested or joint invested enterprises are located in these areas. At the meantime, the improved agricultural productivity has generated large amount of rural surplus laborers many of whom turned to undertake non-agricultural employment

in cities where they can get higher payment than that from agricultural production. It was estimated that over 300 million Chinese peasants moved from the countryside to cities from 1978 to 2004 (Dian, 2004). Rural-urban migration has contributed to the major part of urbanization growth in the post-reform era (Table3). The urbanization rate (usually calculated as the ratio of urban population to the whole population) has increased steadily from 17.92% in 1978 to 44.9% by 2007.

Table3. Urbanization and rural-urban migration in China: 1978-1999

		1978	1980	1985	1990	1995	1999
Urbanization	Urbanization level (%)	17.92	19.39	23.71	26.41	29.04	30.89
	Growth in person (million)	5.82	12.44	10.77	6.51	8.72	9.51
Natural growth	Growth in person (million)	1.44	1.44	2.47	3.06	2.61	2.89
	Share (%)	24.76	11.59	22.89	47.01	29.86	30.44
Rural-urban migration	Growth in person (million)	4.38	11	8.31	3.45	6.12	6.62
	Share (%)	75.24	88.41	77.11	52.99	70.14	69.56

Source: Zhang and Song (2003)

Cities kept on expanding outwardly due to the ever increasing rural immigrants. As Fan (1999) identified, Chinese cities have over the past several decades experienced dramatic expansion in two simultaneous dimensions. Vertically, existing cities of different size have expanded both in population and land area. For instance, the downtown area of Beijing is estimated to have increased by 8.1km² every year since 1978 (Lu, Zhan and Ren, 2001). Meanwhile, to pursue a hinterland for economic development and further city growth, Beijing experienced four-time administrative expansion. Nine counties like Tongxian, Shunyi and Daxing, etc. with an area of 11.988 square kilometers were marked off from Hebei Province to Beijing (Yang, 2007). Horizontally, a large number of newly designated cities have been added to the existing system of cities. This urban system development is actually in line with the recent Chinese urbanization strategy which has shifted to “strictly control the growth of large cities, rationally develop medium-sized cities, and vigorously promote the development of small cities and towns”. Table 4 shows the urban system changes from 1978 to 2007 in China. Cities below 200 thousand persons increased greatly in this period. Such strategy was marked as “urbanization from below” (Ma and Lin, 1993) which calls for the development of small towns¹ and rural industries and encourages peasants to work in rural industries instead of migrating to big cities. Thus, rural industries (mainly from Township and Village Enterprises) boomed as a significant source of income and employment opportunities for villagers. From 1978 to 1994, the Township and Village Enterprises (TVEs) grew greatly when their share of the gross national industrial output increased from 9% to 42% while in the mid-1990s, it was estimated that TVEs employed over one quarter of the rural workforce (125 million population) (Kirkby, Bradbury and Shen, 2000). The number of small towns in China increased from 2176 in 1978 to 18260 in 1998.

Table4. The number of cities of different scales in China (1978-2007)

City population	1978	2007	Increase by (number)
Above 2 million	10	36	26
1-2 million	19	83	64

¹ According to criteria of 1984, small towns are counties over 20 thousand residents of above 10% non-agricultural population where local government resides or counties below 20 thousand residents while non-agricultural population is over 2000 where local government resides.

0.5-1 million	35	118	83
200-500 thousand	80	151	71
Below 200 thousand	49	267	218

Source: National Bureau of Statistics of China (2007), Report of social economic achievements after the reform and opening-up

Note: City population refers to residents with non-agricultural *hukou* registration.

GLOBALIZATION AND URBAN RESTRUCTURING

The opening-up and globalization has made China deeply involved in the world. The influence of globalization on China's urban development has strengthened since China rejoined the World Trade Organization in the 1990s. The establishment of special economic zones² in Southeast China at the beginning of the reform was emphasized by the central government to attract overseas investment. With the advantages of huge domestic market, cheap labor force and favorable policy environment, China has attracted large amount of foreign investment and served as the "world factory". Cities especially those large cities like Beijing, Tianjin, Shanghai and Guangzhou, etc. became the preferential location choice for the foreign investors who relied on these cities as the front to enter Chinese market and using resources. From 1979 to 2000, China's actual usage of foreign capital came to 506 billion U.S. \$ (National Bureau of Statistics, 2001). However, the majority of this investment focused on four coastal provinces (Guangdong, Jiangsu, Fujian and Shanghai) and most of the rest were in other coastal provinces (Graham and Wada, 2001). Foreign-invested or Sino-foreign jointed enterprises boomed in manufacturing industries like ordinary machinery manufacturing, electric equipment and machinery, electronic and telecommunication equipment from which the products are mainly exported to the world market. At the same time, huge amount of laborers were enrolled in these enterprises. For instance, Dongguan, a prefecture-level city of Guangdong Province, has export-dominated economy. The number of immigrants in this city was around three times of local residents (people with local *hukou* registration) by 2008. Such urban development pattern was characterized as "exourbanization" (Sit and Yang, 1997) and "externally driven pattern" (Eng, 1997). This urban growth phenomenon is very popular in those cities of export-relied economy. Thus, urbanization development in China reached two routines: bottom-up and small town-based urbanization and globalization induced urbanization growth.

In the globalization context, China's cities have experienced intense economic restructuring. Urban economic restructuring lies in the shift of the urban functions from a production base to the regional and national centers of services and consumption (Lin, 2004). The ever increasing household income in cities and villages has generated huge demand for services and consumption activities in cities. In the meanwhile, the foreign invested enterprises and those joint corporations have created substantial demand for finance, training, logistics and other business-related services that are mainly supplied by cities. Table 5 shows the economic and employment structure changes in the six large cities in China from 1990 to 2000. It is clear that tertiary industry has increasingly become a major part in the economic structure in the large cities since 1990s.

² Special Economic Zones were founded by the central government under Deng Xiaoping in the early 1980s. They are geographical regions that have economic laws which are more liberal than a country's typical economic laws.

Table5. Economic and employment structure in six large cities of China, 1990-2000

Items	Industries	Year	Beijing	Tianjin	Shanghai	Nanjing	Guangzhou	Xi'an
Economic structure (%)	Primary industry	1990	0.09	0.09	0.04	0.08	0.18	0.12
		2000	0.04	0.04	0.02	0.05	0.04	0.07
	Secondary industry	1990	0.52	0.58	0.64	0.75	0.67	0.43
		2000	0.38	0.49	0.48	0.48	0.44	0.48
	Tertiary industry	1990	0.39	0.33	0.32	0.17	0.15	0.45
		2000	0.58	0.46	0.50	0.46	0.52	0.45
Employment Structure (%)	Primary industry	1990	5.24	6.56	1.48	7.00	11.94	16.44
		2000	0.60	0.50	7.20	0.70	0.70	0.50
	Secondary industry	1990	49.15	57.55	61.27	56.67	42.41	47.16
		2000	35.10	53.40	42.30	48.40	40.80	47.30
	Tertiary industry	1990	45.62	35.89	37.26	36.33	45.65	36.40
		2000	64.30	46.20	50.50	50.90	58.50	52.30

Source: <Discourse Analysis on the Statistical Bulletins of the National Economic and Social Developments> in Beijing, Tianjin, Shanghai, Nanjing, Guangzhou and Xi'an, 1990 and 2000

THE COMPLEXITY OF URBAN TRANSFORMATION IN CHINA

Generally, reform and opening-up, globalization as well as the related policy changes e.g. release of *hukou* system all contributed to the urban transformation in China. However, the process seems to be so fast that many economic, social and environmental problems emerged simultaneously and posed great challenges to planners, governmental officials and scholars in urban China.

DECENTRALIZATION VS URBAN GOVERNANCE

Many problems have emerged in the decentralization process though it diversified Chinese economy in the post-reform era. The construction of development zones has been popular in urban China. However, many projects were proved of low efficiency and returns. Local authorities held the dream of attracting both foreign and domestic investment through these development zones. By the end of 2003, there were already 3837 industrial parks set up by local governments across the country, and the figure further jumped to an astonishing 6015 by the end of 2006. Nevertheless, major development zones are of large land scale but of low usage efficiency. In 2001, the size of built-up area in the national development zones was 23.8% of the planned size while that in the provincial development zones was only 10.8% (Tang and Zhao, 2002). Wang and Cui (2003) through the domestic and international comparison argued that the average efficiency of development zones in China is far lower than their international counterparts. Another problem relates much to the current vocational assessment system in China. Local governments' management of economic growth is now used by the central government as important criteria to assess their performance. To some extent, whether the governor is to be promoted mainly depends on what they did during their office term. A sense of anxiety and urgency among local governors was caused since they are eager to deliver what are desired by the central government (Zhu, 2000). Thus, many tangible and landmark-styled projects e.g. highways, public square and overpass were constructed in cities at different levels so as to pursue their own achievements with maximum publicity. Consequently, long-term urban development plans may not be possibly maintained among several reshuffles since local governors may step down before these plans are materialized. Thus, they would

turn to short-term (within the office term in the local government) achievements which may not be consistent with the long-term urban plans.

Despite the abandonment of central planning and the impacts of market forces in shaping the national and local space-economies, the power of the state is felt in every facet of China's transformation. The reason is that central government was concerned that local interests may overtake national goals due to the decentralization. Thus, political control over localities is retained as a main instrument for central government being relevant (World Bank, 1988 and Huang, 1996). All important events have been determined politically by the state, such as the decisions to reform the economy, to favor the core regions, to decentralize fiscal and administrative powers, etc. In local areas, the invisible as well as the visible "hands" of the state, sometimes wearing gloves to conceal its true identity, are everywhere (Oi and Walder, 1999; Whiting, 1999). In fact, the state is not only the ultimate policymaker but is also the controller which evaluates and approves major project applications and oversees their implementation. The problem is that some large-scale promising projects at the local level should be firstly reported to the central government for permission. Only when the permission after several times of demonstration comes out can the project start. This process usually takes long time before the final decision was made. Thus, some questions emerged toward effective urban governance: How can the local municipalities readjust their development strategies and compete with other cities? How can urban planning be used to realize the municipal strategies? How should achieve a balance between autonomous local development and effective supervision from the central government?

URBAN EXPANSION VS SUSTAINABLE DEVELOPMENT

The development and expansion of China's modern cities have involved large-scale construction and expansion of the human built environment. Due to the continuous human influx, cities are being substantially redeveloped and expanded. From 1998 to 2005, the constructed area of Chinese cities grew from 214 000 km² to 325 000 km², an astonishing growth of over 50 percent. In the meantime, urban problems like congestion and pollution have triggered the longing for a cozy life of much green space, low pollution and convenient traffic system. Many residents moved from the downtown to the suburbs which induced great suburbanization in many large cities of China (Table6).

Table6. Residents increase in downtown and suburbs of cities in China, 1982-1990 (%)

Cities Area	Beijing	Shanghai	Shenyang	Dalian
	1982-1990	1982-1993	1982-1990	1982-1990
Downtown	-3.38	-2.26	-6.73	-11.82
Suburbs	40.46	55.52	91.04	56.00

Source: Zhou and Meng (1998)

This way of urban physical development was questioned for its sustainability. First, urban and peri-urban activities have taken over the arable land in many cities. Take the Beijing-Tianjin-Hebei Metropolitan Region for example (Figure1), the economic boom has induced fast urban expansion which occupied large amount of arable land. According to the Chinese National Land Cover Database (CNLCD) which includes time-series datasets for three (late1980s, 1995, 2000) (Liu, et al., 2005a; Liu, et al., 2005b), the size of built environment of urban and rural areas in China has increased from 11917.05 km² in the late 1980s to 14442.66 km² by 2000 with a growth rate of 21.2%. At the meantime, the arable land decreased from 86342.64 km² to 84090.16 km² in the same period. Figure2 and 3 clearly show the changes of built environment and arable land use from late 1980s to 2000. Specially, the built land size in Beijing has over doubled in this period.



Figure 1 Cities in Beijing-Tianjin-Hebei Metropolitan Region
 Note: this region is also called Jing-Jin-Ji Metropolitan Region

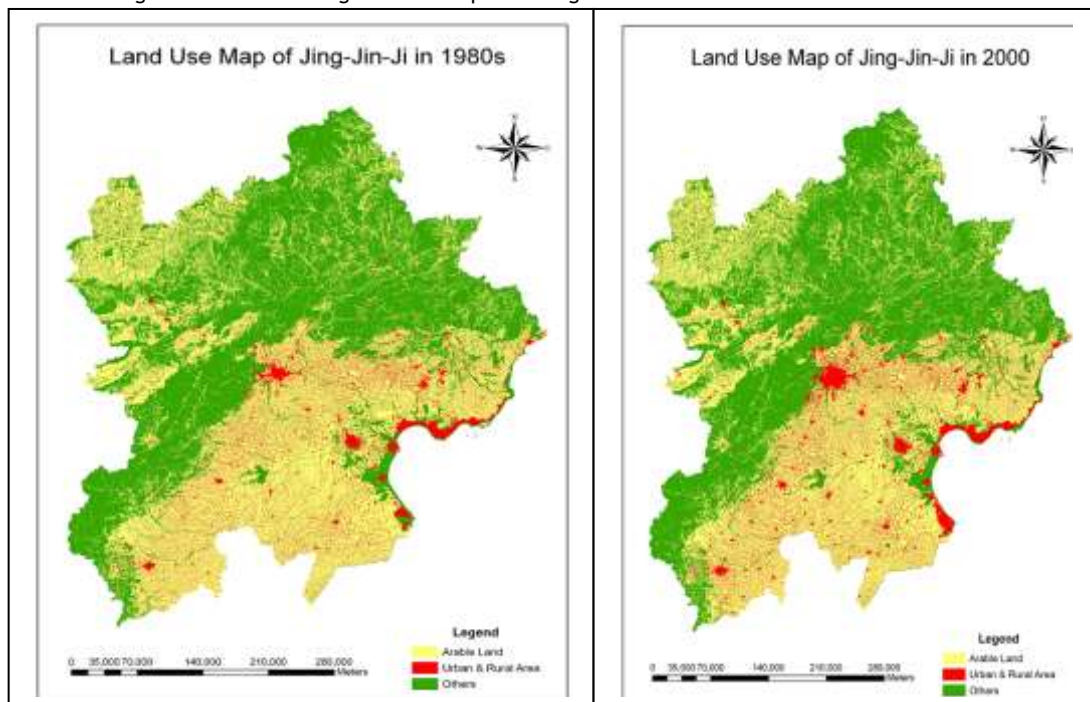


Figure2 Land use in Jing-Jin-Ji Metropolitan Region, 1980s

Figure3 Land use in

Jing-Jin-Ji Metropolitan Region, 2000

Note: A hierarchical classification system of 25 land cover classes was aggregated to arable land, urban & rural area, and others in this study.

Besides, the construction of development zones in almost all the cities not only transformed large arable land into industrial use but also caused an abandonment of arable land, as exemplified in the Pearl River Delta (Lin, 1997; Yeh and Li, 1997). According to Chan and Yao (1999), there were approximately 28000 economic development zones in China that together occupied around 10000 km² of land in the late 1990s. Since China needs to feed about 22% of the world's population with only 7% of the world's arable land, given the fact that around two-thirds of China's agricultural land is poorly productive, the continuous losing farm land because of the urban

expansion and other encroachment has been questioned for its sustainability (Diamond, 2005).

Second, large scale human influx and resource consumption have exceeded resource and environment bearing capacity in many big cities. Take the water usage for example. About half of China's 668 cities do not have reliable fresh water supply. 83% of these cities are in fresh water shortage and over half of them are located in the coastal regions. In Beijing-Tianjin-Hebei Metropolitan Region (Figure2), the water resource ownership per capita which dropped from 300-400 m³ in the early 1990s to less than 200 m³ by 2000 is largely fewer than the U.N. warning line (1000 m³) (Feng and Liu, 2006). Beijing and Tianjin have been suffering water shortage for years (Table7). Particularly in Beijing, the water resource ownership per capita (including those immigrants with other *hukou* registration beside Beijing *hukou*) was less than 300 m³ in 2002 which was one-eighth of the national level and one-thirtieth of the world level. Meng and Wang (2004) argued that the 13.67 million residents in Beijing by 2001 had far exceeded its maximum water bearing capacity (2.35million). This problem was mainly attributed to the ever increasing urban population, large-scale urban construction and industrial water usage (Xiang, 2002).

Table7. Water shortage changes in Beijing-Tianjin-Hebei Metropolitan Region (10⁸m³)

Year Province	1997	1998	1999	2000	2001	2002	2003
Beijing	-18.01	-2.77	-27.49	-34.06	-19.7	-18.51	-16.6
Tianjin	-19.06	-7.92	-22.91	-19.5	-13.4	-16.29	-9.93

Source: Feng and Liu (2006)

MARGINALIZED POPULATION VS URBAN SOCIAL MANAGEMENT

The fast economic and social transformation have generated large amount of marginalized population in cities. It consists of urban poverty and those "floating population"³. In the planned economy, urban residents were enjoying comprehensive social security and welfare which included full-employment system, highly egalitarian income distribution and accessible to basic living materials through rationing system. However, economic and institutional reforms have broken this system and huge amount of laborers were laid off from the SOEs or collectively owned enterprises (COEs) since 1995. It was estimated that a total of 27.147 million employees were laid off from the SOEs (Wu and Huang, 2007). They lost their secure employment (usually called "iron rice bowl"), related social welfare and became the poverty group. The other poverty population mainly comes from the landless farmers due to the urban expansion and land requisition. Approximately 2.5 to 3 million farmers are dispossessed because of the continuous urban expansion and shifting arable land for non-agricultural use (Cao, Feng and Tao, 2008). The fact is that land in China is owned either by the state or the rural collectives while peasants do not own the land but are entitled the right to use it (Wang, 2006). The governments can legally requisition the land and take back the land-use rights from peasants. The problem is that the requisition is not effectively supervised since the governments are both the owner and administer of the land. Mostly, local governments often try every means to push peasants, especially those close to the cities, off their land which would be used for industrial or commercial purposes. Thus, farmers who lost their land usually receive little compensation which can't sustain their lives. These passively-urbanized people⁴ who are actually not involved in the urban social security system would finally become new urban poverty.

Compared with the laid-off citizens and passively-urbanized peasants, rural immigrants are the type of people who come to cities for employment and would go back to their hometown in the future. Similarly, these people who mainly undertake informal jobs of low salary and intensive workload like security staff, restaurant servers and construction workers can't enjoy the urban social welfare either. By 2005, the number of rural immigrants had reached about 150 million, but they were still facing

³ Floating population refers to those rural immigrants who do not hold local cities' *Hukou* registration.

⁴ It is generally accepted that the landless peasants turned to urban citizens who do not own land either. Urbanization statistics usually involves this group of people.

discrimination linked to their rural *hukou*, which deprived many entitlements like housing, access to education, healthcare, and social security (Zeng and Wang, 2007). The urban poverty and rural immigrants were gradually marginalized in cities due to their backward economic condition and rural *hukou* registration. These marginalized people are living bitter life in cities. They can't afford a house or even an apartment while they should take care of themselves for any risks. Many migrant enclaves, low-cost places for urban poverty and those commonly-referred "villages within the city" (*Cheng Zhongcun*) exist in both the inner city and outskirts urban areas in quite many cities of China. Such social differentiation increased the risk of committing crimes and the tension between the poor and the rich in the cities.

In short, both internal and external forces contributed to the urban transformation in China in the post-reform era. The political reform granted much autonomy right to the local municipalities which became self-reliant and active in local development. The shift from rigid centrally-planned economy to the market oriented economy have greatly advanced urban economy and improved household living conditions. Externally, globalization pushed Chinese economy further through bringing in huge investment and competition which led to the economic boom and restructuring in cities that finally attracted large scale rural laborers and induced continuous urban expansion. In this process, cities in China have experienced sharp transformation in economic restructuring, physical expansion, social differentiation and environmental degradation. However, the complexity of urban transformation lies in the fast urban development and insufficient urban planning and management. Figure4 shows the three aspects of mismatch toward urban transformation in China.

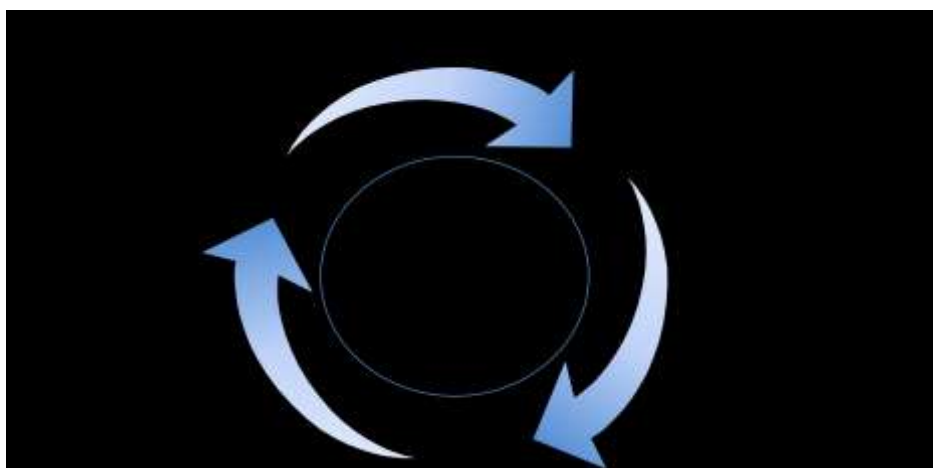


Figure4 Complexity of urban transformation in China

NEW TRANSITIONAL STAGE AND FUTURE URBAN TRANSFORMATION

China is now experiencing a new transitional stage which consists of the shift to knowledge economy in the 21st century and the economic growth change in the current world financial crisis. The world is undergoing a knowledge evolution, unique in speed and pervasiveness of change. The global knowledge economy emerged as a progress involving education, sciences, culture and communication at one and the same time (Sheehan and Tikhomirova, 1998; Portella, 2003). It is featured by the growing importance of knowledge, changing competitiveness and industry composition, convergence of goods, services industries and the new manufacturing (Sheehan, 1999). Knowledge and information are becoming the key drivers of international competitiveness and the global economy, making it crucial to respond rapidly and efficiently to changes. The largest challenge for China is that in the knowledge economy, the global competitiveness mainly lies in a country's ability to create, disseminate and use of knowledge and technology. China, however, is good at processing technology, but in shortage of indigenous innovation capacity (Zeng and Wang, 2007). This can be manifested by the low employment in knowledge-intensive sectors and the low educational level of the labor force (Table 8 and 9).

Table8. Employment in knowledge-intensive sectors in China, 1990-1998

Sector	Employment (percentage of total)		
	1990	1995	1998
Transport, storage, post and telecom	2	3	3
Wholesale, retailing and hospitality	4	6	7
Finance and insurance	0.3	0.4	0.4
Real estate	0.1	0.1	0.1
Social services	1	1	1
Health care, sports and social welfare	1	1	1
Education, culture and entertainment	2	2	2
Scientific research and polytechnical services	0.3	0.3	0.3
Government and social organizations	2	2	2
Service total	13	15	16

Source: National Bureau of Statistics of China (1999)

Table9. Education level of the labor force by region, 2004 (%)

Regions	Illiterate	Primary	Junior and secondary	Senior secondary	College or above
East	4.1	20.8	45.6	18.0	11.6
Middle	4.5	25.7	49.3	13.9	6.6
West	14.2	35.7	33.2	10.2	6.7
National average	6.2	27.4	45.8	13.4	7.2

Source: Zeng and Wang (2007)

China's economy has slowed down greatly since the second half of 2008 due to the export decline induced by the worldwide financial crisis. The international market demand decreased sharply. In consequence, large amount of small and export-relied enterprises reduced production or even went bankrupt (Chen, 2009). The gross domestic product of many cities which have large share of export trade dropped evidently. The state turned swiftly from export-oriented economy to a pattern in which export, consumption and investment develop in a balanced way. One problem that was revealed is that China's industrial activity is still based much on the low labor cost, its current export still heavily relies on less knowledge intensive productions (Sheehan, 1999). Table 10 and 11 show the Chinese export structure and commodities. The distinct feature of this economic pattern is highly dependent on the foreign market which increased the risk of economic shock from the world demand shrink. Moreover, this economic structure is of "high-resource input but low profit gained" since the major part of the profit goes to the research and design as well as the final marketing leaving little part of profit to the manufacturing sector. Another problem facing the Chinese government is that rural residents are reluctant to spend their deposits since they have to prepare for uncertainties in life such as illness and children's education which account for more than 80% of their savings (Yan, 2003). This problem added difficulties to the exploiting domestic market.

Table10. China's export structure by main categories (%)

Year	Total values (million)	All food	Agricultural raw	Fuels	Ores and	Total manufactured
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URBAN TRANSFORMATION: CONTROVERSIES, CONTRASTS and CHALLENGES

	U.S.\$)	items	materials		metals	goods
1985	25632	16.7	6.2	25.9	2.6	36.3
1990	62091	12.7	3.5	8.4	2.1	71.4
1995	148780	8.2	1.8	3.6	2.1	83.9
1998	183809	6.6	1.1	2.8	2.0	87.3

Source: UNCTAD, Handbook of Statistics, Geneva, 2000

Table 11. China's top 10 export commodities, 1997-1998

Commodities	Values (thousands)	Percentage of country total	Percentage of world
Toys and sporting goods	8228785	4.49	24.49
Footwear	8102152	4.42	22.97
Outer garments knit nonelastic	6683356	3.65	16.69
Women's outerwear nonknit	6599427	3.6	16.12
Automatic data processing equipment	6214197	3.39	3.87
Men's outerwear nonknit	5980146	3.26	19.02
Telecommunications equipment, parts and access	5941329	3.24	4.32
Undergarments knitted	4920840	2.68	17.25
Articles of plastic nonelastic	3780707	2.06	6.97
Travel goods and handbags	3292128	1.8	31.03

Source: UNCTAD, World Investment Report, 2000, Geneva, 2000

Based on the above analysis, there would be two major urban transformations to cope with the challenges in the new transitional era.

URBAN ECONOMIC AND SPATIAL TRANSFORMATION

If it was effective for the local municipalities to merely allocate large cheap land for attracting any investment and have land developed for residential and commercial use to increase local revenue, knowledge economy would say no this extensive economic development. A big difference is that knowledge economy emphasizes raising

knowledge and technology level in the economy and adding technological value to the production. Basically, being competitive in the knowledge economy does not imply that China must simply develop high technology. It means that China must encourage its organizations, enterprises and people to acquire, disseminate and use knowledge more effectively for greater economic and social development. Thus, urban economic structure should shift from merely relying on industrial manufacturing to tertiary industries, especially the innovation, R&D and other tech-services. However, one challenge is the knowledge divide across provinces. Figure5 shows the provincial knowledge index comparison based on education, innovation and ICT (Information and Communication Technologies) pillars. There is a tendency of widening knowledge index among provinces. This means that it is still difficult for the cities in many of the provinces to adapt to the knowledge economy. Even in provinces like Guangdong, Fujian, Jiangsu and Hai'nan, not all the cities are capable of completely shifting to a knowledge economy. In this sense, only part of the cities e.g. Beijing, Shanghai, Guangzhou and Tianjin can adjust to a knowledge-based economy. The direct influence of such urban economic transformation is that many industries of low technological level such as clothes manufacturing and spinning would be either upgraded to increase their knowledge intensity and competitiveness or transferred downstairs from cities to counties, towns or even rural areas. At the meanwhile, the urban employment structure would also be geared to the demand of high-educated laborers.

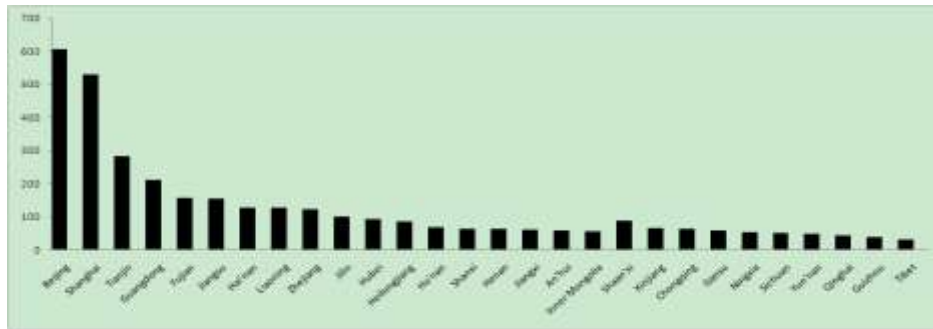


Figure5 Knowledge Index by Provinces, 2000

Source: Hu, A. and Xiong, Y. (2000)

Note: High ($I \geq 150$), Above average ($150 > I \geq 100$), Below average ($100 > I \geq 75$), Low ($I < 75$)

Urban spatial transformation relates much to the economic transformation. One distinct feature of knowledge economy is the halt of extensive industrial expansion and upgrading the technological level in the current industrial system. This implies that knowledge input will replace the previous material, physical and labor force investment in the economic development. Correspondingly, low technological level of industries and laborers as said above, would transfer to the sub-level cities or towns. Thus, urban spatial development would gear to a more compact pattern providing convenient and eco-friendly working and living environment so as to attract more high-tech industries and laborers.

Besides, the other concern comes from the competition of city-regions in the world. The globalization of production has also accelerated the growth of global cities (Friedmann and Wolff, 1982; Sassen, 1991). Global city-regions are rapidly emerging throughout the world as important nodes in the world city system. For instance, London, New York and Tokyo are the global financial articulations while Los Angeles, Frankfurt, Amsterdam and Singapore were multinational articulations in this system. These mega-urban units which consist of many cities and large rural hinterland are essential nodes linking the local and global economies. As Lynch (2005) argued, cities in the developing world need to strongly link with their hinterlands while involving in the world economy. This necessitates urban development in a larger context which includes cities, counties, towns and rural hinterland. In China, city-clusters also emerged like Pearl River Delta, Yangtze River Delta and Beijing-Tianjin-Hebei metropolitan region (Figure6). These regions which are acting as the spatial nexus in resources flows compete with other regions city in the world. In fact, the challenge is that the urban transformation of a single city should be in line with its urban function and the economic structure of the regions. This means that previous urban

development pattern should be adjusted to make cities act complementarily and synergistically in a certain region.



Figure 6 Three Metropolitan Regions in China

Note: Beijing-Tianjin-Hebei metropolitan region is also called Jing-Jin-Ji metropolitan region

URBAN SOCIAL TRANSFORMATION

Urban social transformation consists of two aspects. The first is the potential laid-off people due to the economic restructuring. Even though economic restructuring in the knowledge economy would push many laborers of low skills change employment in other cities, however, the urban economic transformation will directly lead to large amount of laid-off people because of their low skill and knowledge. How should the government manage these people need to be properly dealt. The difference between these newly unemployed people and the rural immigrants is that these people have their property, family and strong social ties in cities. It is impossible for them to migrate to other sub-level cities to find a suitable job. Instead, they need training and re-find a job in the local place. Otherwise, these people can add to the social differentiation in the cities.

The other aspect of urban social transformation lies in the urban social welfare system. How to further exploit domestic consumption has been the top item in the governmental agenda since the world financial crisis. One big challenge is that people are reluctant to spend their deposit money since they have to keep it for the life risks. This type of people mainly includes rural residents, low income urban residents and those who are living in cities but can't enjoy the local social welfare due to their rural *hukou* or other *hukou* registration. The problem was manifested by the ever increasing household deposits since the mid-1990s (Figure7). It shows that annual household deposits continuously increased although the deposit rate kept on dropping. Thus, this reality necessitates the establishment of a comprehensive social welfare system which covers both urban and rural residents.

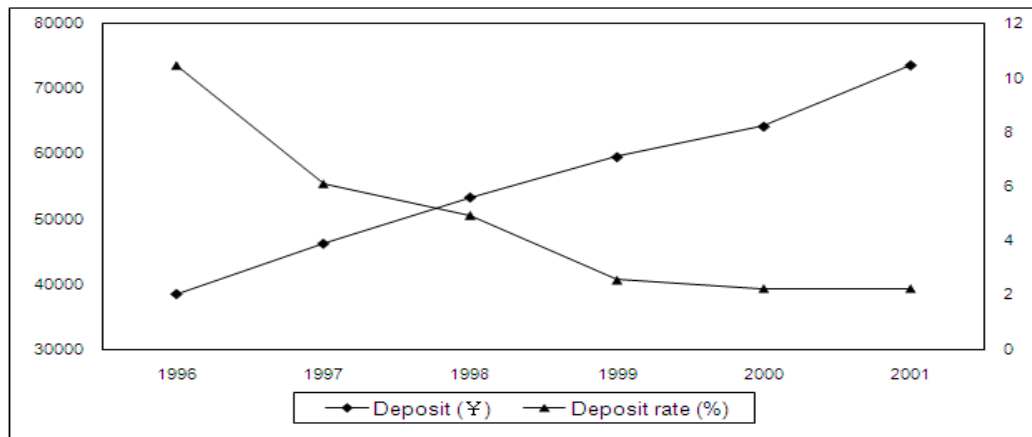


Figure7 Annual household deposits and deposit rates, 1996-2001 (100million ¥)

Source: National Bureau of Statistics of China (2008)

Note: The deposit rate is the average of fixed deposit rates for one, two, three and five years.

CONCLUDING REMARKS

Urban transformation is a complex process which not only includes urban physical and economic transformation, but also involves transformation of political and social development. The complexity of urban transformation in China under both internal and external forces challenges the current urban development pattern which should be geared to a high-efficient, sustainable and society-equal trajectory. The emerging knowledge economy and global financial crisis require new transformation in both urban economic and social aspects. To sum up, it demands a coalition of government, planners, enterprises and scholars to better manage the urban transformation process in China.

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