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## Article

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# How can cities learn from each other? Evidence from China's five-year plans



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## ABSTRACT

International organizations such as the United Nations, the World Bank, the Organization for Economic Cooperation and Development, and the International Monetary Fund routinely organize cross-learning programs on specific topics for their member governments. Likewise, many national governments organize offers little theoretical or practical guidance on how best to organize such cross-learning activities. One fundamental question is whether to proceed on the basis of cohort- or task-oriented programs, where a cohort-based approach would emphasize shared, institutionalized learning over time amongst local governments with shared planning priorities. To assess this question, we use a case study comparing 286 cities and their avowed priorities for China's 11th and 12th Five-Year Plans. The evidence from our case study supports a task-rather than a cohort-oriented approach. Moreover, because of China's unique administrative structure, with an integrated approach entailing proactive national level guidance and directives, we conclude that for most other countries a cohort-oriented approach would be even less effective. The practical implication of these results is that a task-oriented approach to cross-learning is more advisable.

## 1. Introduction

Just as people can learn from each other, so too can governmental institutions. International organizations such as the United Nations, the World Bank, the Organization for Economic Cooperation and Development, and the International Monetary Fund routinely organize cross-learning programs on specific topics for their member governments. A prominent example is the Global Development Learning Network (GDLN) affiliated with the World Bank. Comprising a partnership of over 120 learning centers in nearly 80 countries around the world, it connects people from different countries and regions to promote dialogue and cross-learning on a range of development issues, including public management. It is also common for national-level government agencies to undertake similar initiatives for their subordinate governments, including urban management (Johnson, 1992, pp. 23–44). This kind of top-down orchestrated training program provided by international organizations and national agencies can be an effective means of helping subordinate governments or cities to enhance their organizational and policy effectiveness and improve the efficiency of urban management through learning from their peers. (Kudrle, 2014; Seabrooke, 2012; Siebenhuer; Suplie, 2005; Watts et al., 2003).

A key challenge in this regard is to identify the conditions that may facilitate such cross-regional and cross-national learning (James & Lodge, 2003). Top-down cross-learning programs work only if the participating institutions confront common problems and have similar organizational capacities (Rose, 1991). The question is how to determine which governments should receive what kinds

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of training. Notwithstanding the abundance of such cross-training initiatives, the theoretical foundations for designing such programs are relatively weak, resulting in a largely ad hoc approach.

To address this deficit, we draw upon China as a case study that is not only important in its own right, but that also has significant lessons for other countries or international organizations seeking to promote cross-learning amongst constituent governmental units. To this end, we use the 11th and 12th Five-Year Plans (5YPs) as a proxy survey of 286 cities in China regarding their urban planning orientation and priorities, and we supplement this with additional data from the China City Statistical Yearbook. This kind of survey is the logical starting point for any systematic exploration of how cities might align with shared priorities and circumstances. In fact, as we explain below in more detail, the 5YPs have some important advantages over more commonly used survey instruments that one might find elsewhere. These advantages of the 5YPs are based primarily on the mandatory and comprehensive nature of these extensive undertakings, which are much more consequential than traditional academic surveys. Although we use a similar approach to that applied by Heikkilä and Xu (2014), our use of two sequential 5YPs enables us to gauge the stability over time of issue-based clusters.

This in turn helps us to assess the implication of our findings for other countries. A key finding of this research is that while the centrality of certain planning topics endures from one 5YP to the next, the issue-based cohorts that one finds in a given 5YP period typically do not carry over to the next. If this is the case in China, it is even more likely to be so in other countries that do not have such comprehensive and standardized approaches to planning activities. For this reason, we argue that it is likely to be more productive to focus on training geared to enduring planning issues (such as land use regulations or economic development objectives) than to try to foster enduring learning cohorts.

## 2. Literature review

There is a long tradition of applying cluster analysis to classify cities and regions. As a technique often used in the social sciences to create classification systems, the basic aim of cluster analysis is to create groups of objects that are similar to each other with respect to one or more criterion variables. The sorting is designed to maximize homogeneity within clusters while maximizing heterogeneity among them (Makra & Sümeghy, 2007). Much of the literature in this area can be traced back to the study by Harris (1943) who formulated a functional classification of American cities using data on occupation type and employment by sector. Subsequent work along these lines includes Nelson (1955), Wilkinson (1964), Armen (1972), Britton (1973), Kass (1973) and Frenkel (2004). Functionality was assessed in these works with respect to some combination of employment, occupation and land use data.

Other studies have employed alternative criterion variables for their clustering of regions and cities. For example, Jones and Jones (1970) adopted two dimensions of urban growth and development and socioeconomic status to define four possible types of American cities; Neal (2006) classified American cities on the basis of the local prevalence of specific types of restaurants; Cohen and Nijkamp (2007) classified more than 200 European cities by means of their e-images; while Makra and Sümeghy (2007) classified Hungarian cities and counties according to their environmental quality and level of environmental awareness.

Nelson (1957) and Smith (1965) were early critics of the functional approach to the classification of cities. They argued that a taxonomy of cities generated by such methods may be a useful starting-point for further work, but begs the ‘So what?’ question. Heikkilä and Xu (2014) conducted a cluster analysis of keywords culled from the 5YPs of Chinese cities, producing seven distinct clusters or non-overlapping groups of cities in China based on similarities in their declared priority tasks for the coming five-year planning horizon. Based on statistical profiles of those clusters, together with the key word analysis, they proposed seven distinct research and training initiatives tailored to the specifications of each group. Their argument is that a “one size fits all” approach to urban planning in China would fail to acknowledge the robust diversity across China’s cities, while attempting to fashion hundreds of distinct planning strategies in isolation would miss out on important opportunities for cities to learn from each other. Tailoring urban planning strategies to subsets of cities that are formed on the basis of shared planning goals, they argue, is a sensible intermediate solution.

A notable limitation of the Heikkilä-Xu study is that their data analysis is conducted for only a single time frame – that of the 11th 5YP, with its planning horizon spanning the years 2006–2010. Because of this limitation, one cannot readily assess whether the clusters of like-minded cities emerging from their analysis are likely to be stable over time. This has potentially important implications for longer term strategies to build development capacity on a systematic basis over the longer term. Nor can one track how the key principal tasks identified in the 5YPs evolve over time. This paper overcomes that limitation by replicating the research design applied by Heikkilä-Xu and applying it to the 12th 5YP, running from 2011 to 2015, for which online data are now available. By comparing results from the 11th and 12th 5YPs, we shed light on these important questions.

## 3. Data and methods

In China, the administrative hierarchy is much more tightly organized and centralized than in the West (Qian & Xu, 1993; Tsui & Wang, 2004). Notwithstanding its vast size, the entire political bureaucracy can in principle be represented as one fully integrated organizational chart. An important vehicle for policy formulation and implementation within the Chinese context is the Five-Year Plan which in turn has its origins in the Soviet-era ideal of a far-reaching state-directed resource allocation plan. While the 5YP planning process has been linked to monumental failures in the Soviet Union and elsewhere, it continues to be a centerpiece in the implementation of China’s governance and development strategies (Heilmann & Melton, 2013; Hu, 2013). As a planning institution, the 5YP process in China has evolved over recent decades, and is no longer focused directly on resource allocation and production control, but is currently more akin to what those in the West might term a strategic planning document (Heilmann, 2011; The

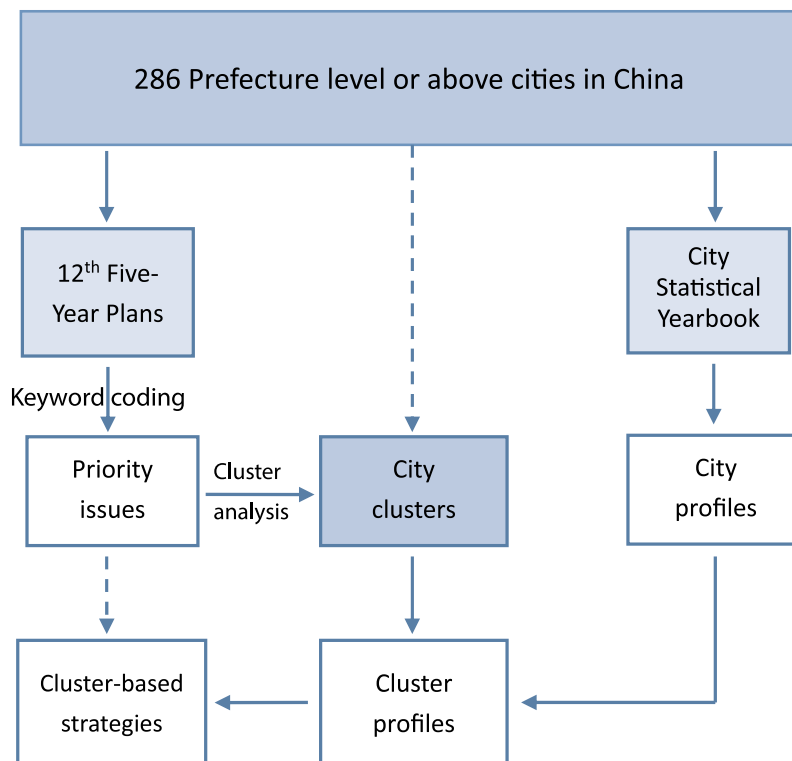


Fig. 1. The basic methodological approach.

*Economist*, 2015). These 5YPs reflect the hierarchical institutional structure within which they are embedded, as locally driven policy initiatives are moved up the chain of command within the frame of broad policy parameters set from the top down (Kennedy & Johnson, 2016).

Somewhat surprisingly, but certainly good news for scholars of China's urbanization, the 5YPs of all prefectural level cities in China (excluding the lone exception of Lhasa, Tibet) are available online. It is instructive to consider how these 5YPs compare, collectively, to a hypothetical survey that researchers might wish to undertake about urban planning priorities in Chinese cities. Certainly, online access to the 5YPs dominates any would-be survey in terms of access, coverage, consistency, comprehensiveness and consequence. Few scholarly researchers would have access to senior staff in more than a handful of municipalities, or even know where to send a survey that would land on the right desks in all of China's prefectural level cities. Moreover, even if a survey instrument were to be sent out the likelihood of its being completed and returned is small. Any surveys that were completed and returned might also be of dubious consistency. In contrast, the 5YPs offer complete coverage; they are undertaken on a consistent basis throughout the country and receive the careful attention of those municipalities. These plans are also consequential, because there is an expectation that budget allocations will be consistent with expressed priorities in those 5YPs (Heilmann & Melton, 2013).

Fig. 1 sets out the basic methodology and approach employed in this research. The 12th 5YPs are selected for the 286 cities in China that are prefecture level or above. Each 5YP typically has five major elements: a review of achievements over the previous five years, an evaluation of development circumstances (somewhat akin to a SWOT analysis), the development guidelines and specific targets for the next five years, a list of principal tasks for this same planning horizon, and a general action plan (Heilmann, 2011; Heikkilä & Xu, 2014). For our purposes, the principal tasks section is most pertinent, as it translates broader guidelines into discrete, substantial, concrete planning tasks. Keyword coding was used based on an exhaustive and detailed review of the top-level headings within the “principal tasks” section of the 5YPs.<sup>1</sup> Keywords identified by means of content analysis are then employed as basis for a cluster analysis, which results in the meaningful grouping of cities within the selected sample.

In total, thirty-two key words were culled from these Five-Year Plans, as shown in Table 1. Following Heikkilä-Xu, we crop off seven ubiquitous keywords that are found in the vast majority [ > 260] of cases because these are of little value in delineating

<sup>1</sup> Content analysis and keyword coding are long established methods of discourse analysis (see for instance Kumar & Pallathucheril, 2004; Hsieh & Shannon, 2005). Importantly, the methodology employed in this paper builds on the methodology developed in Heikkilä and Xu (2014). Please see Heikkilä and Xu (2014) for a detailed discussion of the method in general and as applied to the analysis of the Chinese city level 5YPs in particular.

**Table 1**

Extraction of keywords from 12th five-year plans.

Category	Key Word (Principal Task)	Number of cities citing this issue	Illustration
<b>Ubiquitous issues</b> (recurring in almost all cities' five-year plans)	Public Services Provision	286	providing better public services of education, housing, health care, social security, etc.
	Industrial Development	285	upgrading of traditional industry, development of sunrise industry, industrial park development, etc.
	Rural Development	283	agriculture development and village upgrading
	Tertiary Industry Development	282	service industry development, finance, real estate, tourism, etc.
	Energy Saving and Environment Protection	275	cyclical economy, ecological preservation and restoration, environmental protection, energy saving, etc.
	Open Up and Cooperation	264	international trade and competition, import and export, cooperation with domestic and foreign regions, etc.
	Institutional Reform	260	reform of administrative system, transition from planned economy to market-oriented economy, etc.
<b>Criterion issues</b> (Identified in a number of but not all cities' five-year plans)	Urban Development	230	renewal of old districts, urban planning and function distribution, city management, etc.
	Infrastructure Construction	229	transportation system, water conservancy, energy provision, communication facilities, etc.
	Science& Technology Innovation	225	promoting advancement of science and technology, improving innovation capability, education development, etc.
	Cultural Development	150	promoting ideological and ethnic progress, enriching cultural and spiritual life, development of cultural industry, etc.
	Rural-urban Coordination and Integration	136	planning rural and urban development as a whole, encouraging cooperation and joint development between rural and urban areas, reducing urban-rural gap, etc.
	Social Development and Administration	124	democracy, governed by law, stability and harmony of society, public safety, credit system, etc.
	Spatial Distribution and Function Deployment	112	Identifying positioning and function of city areas including urban and rural parts
	Investment and Consumption Promotion	60	attracting investment from state-owned enterprises, private enterprises, foreign companies, and encouraging domestic consumption
	Urban Function Zone Development	29	development of certain urban function zones, liking new town, industrial park, tourism and resort district, etc.
	Tourism Industry Development	21	promoting tourism industry development, liking hotel, heritage conservation, facilities, propaganda, etc.
	Megalopolis or Economic Circle	19	promoting cooperation and integration with surrounding cities to achieve jointly development
	Ocean Economy	17	development of ocean related industries
	Information Initiative	10	information related infrastructures, application of information technology in industry and city, information safety, etc.
<b>Isolated issues</b> (occurring only in rare cities' five-year plans)	Eradication of Poverty	7	development in poor districts, helping poor people to become better off, etc.
	Harbor Development	7	construction of harbor-related infrastructures, development of harbor related industries and services, etc.
	Private Economy Development	6	promoting the development of private economy
	Cooperation with Taiwan	4	strengthening economic, cultural and other cooperation with Taiwan
	Minority Areas Development	3	economic, cultural development in minority areas, unity with Han nationality, etc.
	Logistics Development	2	promoting the development of logistics industry
	Recovery of Disaster Areas	2	economic development, reconstruction, environmental protection and poverty eradication in disaster areas
	Development of Migration Affairs	1	settlement of migrants, improvement of life quality for migrants, development of migration districts, etc.
	Public Safety System	1	keeping stability of society, preventing hidden dangers, the emergency management, etc.
	Hosting Mega Events	1	the Youth Olympic Games in Nanjing
	Water Resource Utilization	1	saving water resources, and high efficient utilization of water resources
	Development of The Three Gorges Reservoir Area	1	ecology and environment protection, geological disaster prevention, economic development, etc.

between different types of cities. Likewise, we exclude from our analysis twelve isolated keywords that are found only in rare cases [ $< 10$ ], and are therefore not indicative of any general typologies. This leaves thirteen criterion keywords that constitute the basis of the cluster analysis. More precisely, it is the  $(286 \times 13)$  matrix of zeros and ones that is the basic input to the two-step cluster

**Table 2**

The cluster means for each criterion variable (keywords).

Criterion Variable	Grand Mean	Cluster Means					
	All (286 cities)	Cluster 1 (40 cities)	Cluster 2 (38 cities)	Cluster 3 (73 cities)	Cluster 4 (45 cities)	Cluster 5 (52 cities)	Cluster 6 (38 cities)
Urban Development	.80	0.13 (–)	1.00 (+)	1.00 (+)	0.89 (+)	0.98 (+)	0.61 (–)
Infrastructure Construction	.80	0.70	0.87	0.77	1.00 (+)	0.56 (–)	1.00 (+)
Science & Technology Innovation	.79	0.70 (–)	0.95 (+)	1.00 (+)	0 (–)	0.96 (+)	1.00 (+)
Cultural Development	.52	0.58	0.71 (+)	0.52	0.22 (–)	0.60	0.55
Rural-urban Coordination and Integration	.48	0.70 (+)	0.24 (–)	0.45	0.36 (–)	0.58 (+)	0.53
Social Development and Administration	.43	0 (–)	0.45	0 (–)	0.40	0.98 (+)	1.00 (+)
Spatial Distribution and Function Deployment	.39	0.28 (–)	0.39	0.41	0.29 (–)	0.15 (–)	0.92 (+)
Investment and Consumption Promotion	.21	0.38 (+)	1.00 (+)	0 (–)	0.09 (–)	0 (–)	0.08 (–)
Urban Function Zone Development	.10	0.23 (+)	0.05	0.08	0.09	0.15	0
Tourism Industry Development	.07	0.05	0.03	0.04	0.20	0.06	0.08
Megalopolis or Economic Circle	.07	0.18 (+)	0.03	0.07	0.04	0.06	0.03
Ocean Economy	.06	0.05	0.16 (+)	0.04	0.07	0.02	0.05
Information Initiative	.03	0	0	0.01	0	0.17 (+)	0

Note: + (–) cells indicate a cluster mean at least 0.2 greater (less) than the corresponding grand mean.

analysis, with a “1” (“0”) indicating that the city in question did (not) include that principal task in its Five-Year Plan.

#### 4. From city clusters to development policies

The results of the cluster analysis are presented in Table 2. The first column of data enumerates the “grand means” for the thirteen criterion variables produced by the prior keyword analysis. For example, the grand mean of 0.787 for “Science & Technology Innovation” indicates that 78.7% of the 286 cities included this principal task within their respective 12th 5YPs. A similar interpretation applies to the six additional columns with reference to the subsets of cities within those respective clusters. Now, let  $\pi_i$  denote the proportion of all 286 cities that include the  $i$ ’th principal task in their 5YPs. The variance of the corresponding binomial variable is given by  $\sigma_i^2 = \pi_i(1-\pi_i)$ . This variance is largest when the proportion  $\pi_i = 0.5$ , and is smallest where  $\pi_i$  approaches the extreme values of 1 or 0. In Table 2, cells shaded + (–) indicate cluster means that are at least 0.2 standard deviations ( $\sigma_i$ ) above (below) the corresponding grand means.<sup>2</sup> Visual inspection of the rows in Table 2 shows that the first eight principal tasks are the more decisive in delineating clusters. Likewise, visual inspection of the columns helps to identify those principal tasks that are more sharply associated, positively or negatively, with any given cluster.

A similar approach is used to sketch out socio-economic profiles of the six clusters. In Table 3, data are drawn from the China City Statistical Yearbook for the year 2010, which coincides with the year that the 12th 5YPs were being finalized. Twenty seven variables are set out for each city, covering factors such as population, labor and employment, land resources, general economic conditions, the environment, culture, social welfare, and infrastructure facilities. To enhance comparability, the variables are expressed in percentage or per capita terms wherever possible. Note that Tables 2 and 3 provide distinctive yet complementary information about the clusters.

Recall that the clusters were formed on the basis of the principal task keywords identified from the respective five-year plans. Accordingly, Table 2 provides insight into the relationships between distinct clusters and principal tasks identified in the 5YPs. The socio-economic variables in Table 3, in contrast, are not used to form the clusters. Instead, they are only used after the fact to help instill a richer understanding of how these clusters of cities differ from one another.<sup>3</sup> In Table 3 we use the same arbitrary but useful rule of thumb to help visualize cluster distinctions from a socio-economic perspective. Each column corresponding to a cluster indicates the number of standard deviations the cluster mean is above or below the corresponding grand mean for the variable in question.

We identify one prototypical city within each cluster. The prototype is defined as that city within a cluster with the socio-economic profile most closely resembling the vector of cluster means, based on a root mean square metric. More specifically, for any

<sup>2</sup> Note that these differentials between the cluster means and the corresponding grand means are not indicative of any statistical significance because the clustering algorithm is not based on a random assignment. Thus, the 0.2 threshold for showing green or red cells is merely an arbitrary but convenient means of highlighting the distinctive profiles of the six clusters.

<sup>3</sup> Heikkilä and Xu (2014) use an analogy – that of consumer focus groups – to clarify this distinction. Those focus groups (clusters) may be formed on the basis of expressed consumer preferences regarding priority purchases. Additional socio-economic profiling of these groups may help one to understand, for example, that wealthy middle-aged men are more interested in golf clubs while teenage girls are more interested in social media applications.

**Table 3**  
The Socio-economic profiles of the six clusters.

Variables		Cluster means (expressed as standard deviations above or below grand mean)							
All cities		Grand Mean	Std. Deviation	C1	C2	C3	C4	C5	C6
Registered population at the year-end (10,000)		436.28	308.47	-0.19	-0.03	0.20 (+)	-0.41 (+)	0.21 (+)	0.04
Percentage of employed persons in state units		0.54	0.13	-0.30 (-)	-0.13	0.26 (+)	0.05	-0.15	0.10
Percentage of persons in private enterprises and self-employed individuals		0.46	0.13	0.30 (+)	0.13	-0.26 (-)	-0.05	0.15	-0.10
Population density (person/sq.km)		428.36	327.57	0.11	0.04	0.04	-0.17	0.19	-0.31 (-)
Population density in urban district (person/sq.km)		1001.92	1066.38	-0.03	-0.01	0.11	-0.16	0.08	-0.09
Per capita gross domestic product in urban district (yuan)		44721.32	29030.58	0.00	0.19	0.10	-0.36 (-)	0.20 (+)	-0.23 (-)
Percentage of primary industry in GDP (%)		13.50	8.20	-0.07	-0.27 (-)	0.04	0.23 (+)	-0.18	0.23 (+)
Percentage of secondary industry in GDP (%)		50.88	10.62	0.15	-0.03	0.07	-0.25 (-)	0.19	-0.22 (-)
Percentage of tertiary industry in GDP (%)		35.63	8.71	-0.12	0.29 (+)	-0.12	0.08	-0.07	0.06
Percentage of Gross output value of domestic enterprises		0.85	0.16	-0.18	-0.30 (-)	0.09	0.34 (+)	-0.14	0.09
Percentage of gross output value of enterprises with investment from HK, MC and TW		0.06	0.08	0.42 (+)	0.33 (+)	-0.13	-0.25 (-)	0.00	-0.22 (-)
Percentage of Gross output value of enterprises with investment from other countries		0.09	0.10	-0.04	0.20 (+)	-0.04	-0.33 (-)	0.21 (+)	0.03
Ratio of Industrial Wastes Treated and Utilized (%)		82.79	21.08	-0.10	0.10	0.03	-0.06	0.03	-0.02
Ratio of Residential Waste Water disposal in urban area (%)		72.72	19.32	0.14	0.33 (+)	0.18	-0.41 (-)	0.03	-0.36 (-)
innocuous disposal of domestic garbage (%)		82.72	21.86	-0.02	0.08	0.06	-0.07	0.15	-0.28 (-)
Number of theatres and cinemas per 10,000 persons		0.03	0.04	0.17	0.26 (+)	-0.14	-0.06	-0.03	-0.05
Books of public library per 100 population (piece)		47.60	74.50	-0.15	0.28 (+)	-0.10	-0.22 (-)	0.35 (+)	-0.15
Number of University students per 10,000 persons		222.09	1027.00	-0.08	-0.03	-0.06	-0.11	0.31 (+)	-0.07
Number of primary school per 10,000 persons		1.98	1.25	0.06	0.08	-0.05	0.08	-0.23 (-)	0.16
Number of secondary schools per 10,000 persons		0.53	0.13	0.07	0.27 (+)	0.03	0.10	-0.28 (-)	-0.15
Number of Public Transportation Vehicles Per 10,000 Persons		7.62	7.73	0.03	0.06	-0.06	-0.34 (-)	0.34 (+)	-0.04
Area of roads per capita (sq.m)		10.52	7.05	-0.09	0.12	0.17	-0.32 (-)	0.19	-0.24
Green areas per capita (sq.m/person)		41.26	53.83	0.23 (+)	0.05	-0.13	-0.16	0.17	-0.09
Coverage rate of urban green area (%)		39.62	22.14	-0.10	0.35 (+)	0.02	-0.11	-0.04	-0.10
Number of beds of hospital per 10,000 persons		34.71	14.02	-0.02	0.14	-0.09	-0.13	0.29 (+)	-0.18
Per Capita Consumption of Water (cu.m/person)		12.24	19.35	-0.08	0.24 (+)	-0.17	-0.10	0.33 (+)	-0.18
Per capita consumption of electricity power (kwh/h)		221.67	352.20	0.02	0.33 (+)	-0.13	-0.16	0.22 (+)	-0.21 (-)

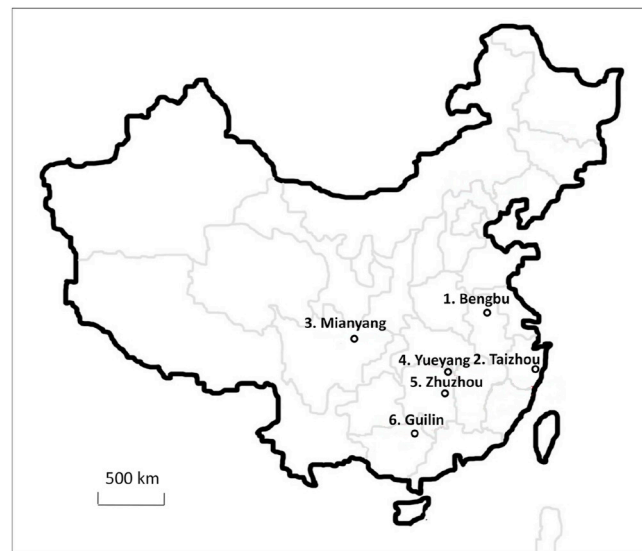


Fig. 2. Six prototypical Chinese cities.

city within cluster  $j$ , let

$$SS = \sum_{i=1}^{i=27} [(v_{ij} - m_{ij})/m_{ij}]^2$$

represent the sum of normalized squared deviations from the cluster mean across all 27 variables. The prototypical city for cluster  $j$  is that city for which  $SS$  is minimized. These six prototypes serve as representatives or signposts for their respective clusters, and they are depicted in Fig. 2. Quite surprisingly, one of the six prototypes (Mianyang, in Sichuan province) to emerge from our analysis of the 12th 5YP was also one of the seven prototypes uncovered in the original Heikkilä-Xu study using data from the 11th 5YP.

The data summarized above provide insights regarding the planning orientation and context of cities within each of the six clusters.<sup>4</sup> We examine these briefly in turn, where each cluster is identified by its prototypical city.

Seen in Table 4, one distinguishing feature of this first cluster is the relative paucity of socio-economic characteristics for which the cluster means deviate notably from the corresponding grand means. Thus, this cluster is the one whose composite socio economic profile most closely resembles that for the entire set of prefectural level cities in China. The lone exception pertains to the fact that cities in cluster 1 have a larger percentage of workers who are either self-employed or employed by the private sector, and a correspondingly smaller percentage employed by state units, i.e. government or state-owned enterprises.

In terms of principal tasks identified in their 12th 5YPs, the cities in cluster 1 as a whole are more focused on investment and consumption promotion, rural-urban integration & coordination, and urban function zone development. Referring back to Table 1, this suggests that cities in cluster 1 are, relatively speaking, more focused on a range of practical land use planning matters. This, coupled with the larger share of employees in the private sector, may be indicative of municipal governments that are focused on planning for growth, both on a regional (urban-rural) and local (special districts) scale. At the same time, cities in cluster 1 are relatively less preoccupied by a range of what might be termed urban administrative or management matters. On the whole, this suggests that capacity building for cities in cluster 1 could focus on practical aspects of land use planning and urban economics, together with policies to foster private sector investments.

The composite socio-economic profile of cities in cluster 2 portrays a set of cities in China that are relatively advanced in terms of service sector employment, foreign direct investment, and quality of life indicators such as theatres, libraries, water & power consumption, and green areas (see Table 5). These are also outward/forward looking cities, as indicated by their 5YP focus on cultural development, investment and consumption promotion, the ocean economy, science & technology innovation and urban development. Thus, these are cities that could benefit from capacity building efforts linked to the role of cultural and creative industries in promoting local economic development.

Cities in cluster 3, as a whole, are larger (in terms of registered population) than those in other clusters, and they have a notably larger share of persons employed by state units (see Table 6). In the latter regard, this is a mirror image of cluster 1, which had a small proportion of persons employed by state units. In terms of principal tasks, cities in cluster 3 tend to focus on urban development and science & technology innovation, and less on social development & administration and investment & consumption promotion. Taken as a whole, this composite portrays a set of cities in China that could benefit from capacity building efforts directed to an upgrading of

<sup>4</sup> Note that there is no particular significance regarding the order in which these clusters are presented. Cluster 1 is not “ahead” of cluster 6 in any meaningful sense.



**Table 4**

The city profiles of cluster 1.

The prototypical city: Bengbu, Anhui province	
Principal tasks (+)	Socio-economic characteristics (+)
<ul style="list-style-type: none"> <li>● Rural-urban coordination &amp; integration</li> <li>● Investment &amp; consumption promotion</li> <li>● Urban function zone development</li> </ul>	<ul style="list-style-type: none"> <li>● Percentage of persons in private enterprises and self-employed individuals</li> </ul>
Principal tasks (–)	Socio-economic characteristics (–)
<ul style="list-style-type: none"> <li>● Urban development</li> <li>● Science &amp; technology innovation</li> <li>● Social development &amp; administration</li> <li>● Spatial distribution &amp; function deployment</li> </ul>	<ul style="list-style-type: none"> <li>● Percentage of employed persons in state units</li> </ul>

**Table 5**

The city profiles of cluster 2.

The prototypical city: Taizhou, Zhejiang province	
Principal tasks (+)	Socio-economic characteristics (+)
<ul style="list-style-type: none"> <li>● Urban development</li> <li>● Science &amp; technology innovation</li> <li>● Cultural development</li> <li>● Investment and consumption promotion</li> <li>● Ocean economy</li> </ul>	<ul style="list-style-type: none"> <li>● Share of tertiary industry in GDP</li> <li>● Foreign (plus Hong Kong, Taiwan &amp; Macao) enterprises' share of gross output</li> <li>● Urban wastewater disposal rate</li> <li>● Number of theatres, cinemas &amp; public libraries</li> <li>● Urban green area</li> <li>● Per capita water consumption</li> <li>● Per capita consumption of electrical power</li> </ul>
Principal tasks (–)	Socio-economic characteristics (–)
<ul style="list-style-type: none"> <li>● Rural-urban coordination and integration</li> </ul>	<ul style="list-style-type: none"> <li>● Domestic enterprise share of gross output</li> </ul>

**Table 6**

The city profiles of cluster 3.

The prototypical city: Mianyang, Sichuan province	
Principal tasks (+)	Socio-economic characteristics (+)
<ul style="list-style-type: none"> <li>● Urban development</li> <li>● Science &amp; technology innovation</li> </ul>	<ul style="list-style-type: none"> <li>● Registered population</li> <li>● Share of employed persons in state units</li> </ul>
Principal tasks (–)	Socio-economic characteristics (–)
<ul style="list-style-type: none"> <li>● Social development &amp; administration</li> <li>● Investment &amp; consumption promotion</li> </ul>	<ul style="list-style-type: none"> <li>● Share of employed persons in private sector or self-employed</li> </ul>

state-owned enterprises.

The composite socio-economic profile of cities in cluster 4 indicates that this is a group of cities in China that lags in terms of basic development and quality of life indicators (see Table 7). Primary industry and domestic enterprises comprise a relatively large share of GDP, while transportation infrastructure, incomes, foreign direct investment, libraries, and other basic infrastructure metrics are all below the corresponding values for all prefectural level cities taken as a whole. Not surprisingly, the principal tasks identified in their 5YPs focus on basic urban development and infrastructure provision, with less emphasis on cultural development, science & technology innovation, or other more advanced planning methods. This suggests that capacity building efforts for cities in this cluster should be directed to basic infrastructure planning evaluation methods.

Although Zhuzhou, the prototypical city from cluster 5, is also located in Hunan province, it has a distinctly different profile compared to Yueyang, its counterpart in cluster 4. Cities in cluster 5, on the whole, have larger registered populations, more investment from abroad, more university students, and better libraries, public transportation, hospitals, and higher per capita consumption of water and electricity (see Table 8). At the same time, they have fewer primary and secondary schools per capita, which suggests that cluster 5 contains many cities that attract university students from surrounding areas or elsewhere from across the country. This contrast with cluster 4 is also evident in the principal tasks in their respective 5YPs. Cities in cluster 5 tend to emphasize information initiatives, science & technology innovation, social development & administration, and rural-urban integration &

**Table 7**  
The city profiles of cluster 4.

Prototypical city: Yueyang, Hunan province	
Principal tasks (+)	Socio-economic characteristics (+)
<ul style="list-style-type: none"> <li>• Urban development</li> <li>• Infrastructure construction</li> </ul>	<ul style="list-style-type: none"> <li>• Primary industry share of GDP</li> <li>• Domestic enterprise share of gross output</li> </ul>
Principal tasks (–)	Socio-economic characteristics (–)
<ul style="list-style-type: none"> <li>• Science &amp; technology innovation</li> <li>• Cultural development</li> <li>• Rural-urban coordination and integration</li> <li>• Investment &amp; consumption promotion</li> <li>• Spatial distribution and function deployment</li> </ul>	<ul style="list-style-type: none"> <li>• Registered population</li> <li>• Urban per capita GDP</li> <li>• Secondary industry share of GDP</li> <li>• Investment from abroad</li> <li>• Urban residential waste disposal</li> <li>• Libraries books per capita</li> <li>• Public transportation</li> <li>• Roads</li> </ul>

**Table 8**  
The city profiles of cluster 5.

Principal tasks (+)	Socio-economic characteristics (+)
<ul style="list-style-type: none"> <li>• Urban development</li> <li>• Science &amp; technology innovation</li> <li>• Rural-urban coordination &amp; integration</li> <li>• Social development &amp; administration</li> <li>• Information initiative</li> </ul>	<ul style="list-style-type: none"> <li>• Registered population</li> <li>• Investment from abroad</li> <li>• Library books &amp; university students per capita</li> <li>• Public transportation, hospital beds, water and electricity consumption</li> </ul>
Principal tasks (–)	Socio-economic characteristics (–)
<ul style="list-style-type: none"> <li>• Infrastructure construction</li> <li>• Spatial distribution &amp; function deployment</li> <li>• Investment &amp; consumption promotion</li> </ul>	<ul style="list-style-type: none"> <li>• Primary &amp; secondary schools per capita</li> </ul>

coordination. These tasks are broadly consistent with the cluster's association with universities and other indicators of higher learning. Capacity building for cities in cluster 5 could be well directed to the role of information technology as a tool for more sophisticated, data-driven modes of urban planning and management.

Cluster 6 has in common with cluster 4 a socio-economic profile that is heavily oriented towards primary industry production, with a full range of lagging development or quality of life indicators, including per capita urban income, investments from abroad, population density, waste disposal and electricity consumption (see Table 9). Its approach to principal tasks within the 12th 5YP planning horizon, however, is quite opposite to those profiled in cluster 4. Cities in cluster 6 focus on a set of principal tasks – such as science & technology innovation, social development administration, and spatial distribution & administration – that are more commonly associated with cities in China that have stronger socio-economic attributes. On the whole, this composite profile for

**Table 9**  
The city profiles of cluster 6.

Prototypical city: Guilin, Guangxi zhuang autonomous region	
Principal tasks (+)	Socio-economic characteristics (+)
<ul style="list-style-type: none"> <li>• Infrastructure construction</li> <li>• Science &amp; technology innovation</li> <li>• Social development administration</li> <li>• Spatial distribution and administration</li> </ul>	<ul style="list-style-type: none"> <li>• Primary industry share of GDP</li> </ul>
Principal tasks (–)	Socio-economic characteristics (–)
<ul style="list-style-type: none"> <li>• Urban development</li> <li>• Investment &amp; consumption promotion</li> </ul>	<ul style="list-style-type: none"> <li>• Population density</li> <li>• Urban per capita GDP</li> <li>• Secondary industry share of GDP</li> <li>• Investment from Hong Kong, Taiwan &amp; Macau</li> <li>• Urban residential waste disposal</li> <li>• Garbage disposal</li> <li>• Electricity consumption</li> </ul>

**Table 10**  
The scenario analysis of evolving five year plans.

	Clusters remain intact	Clusters diffuse
Tasks endure	"Stasis"	"Task cohesion"
Tasks evolve	"Cohort cohesion"	"Reset"

cluster 6 conveys an impression of lagging cities that are intent on transforming themselves through ambitious planning efforts. Accordingly, capacity building in these cities may well be directed to stronger basic education so that the requisite human capital is in place to underpin any such transformative endeavors.

## 5. Comparing the 11th and 12th five-year planning clusters

Thus far we have taken the Heikkilä-Xu method, developed initially for the 11th Five Year Plan, and reapplied it to the 12th Five Year Plan. While the results are interesting and potentially useful in their own right, the primary motivation for this paper is to gain insights into the stability properties of planning clusters over time. Having two sets of clusters produced for sequential 5YP periods enables a first step in this direction. At this point it is useful to delineate between several polar cases that could conceivably emerge, as well as the implications each would have for national planning policies and institutions in China.

As presented in Table 10, *Stasis* refers to a polar case whereby both planning clusters and their associated principal tasks remain essentially unchanged from one 5YP to the next. If this were the case, it would seem to affirm a process whereby the relationship between planning clusters and their affiliated tasks would be deepened and institutionalized. Another polar case is that of *cohort cohesion*, whereby clusters of cities remain intact from one 5YP to the next, but where the principal tasks associated with those clusters evolve over time. This is analogous to a cohort of students who stay together over time even as they move to progressively more advanced subjects in subsequent years. This polar case would tend to justify some degree of institutional affiliation amongst cohort members, to foster shared or mutual learning as they progress together through different planning task priorities.

The diagonal opposite of this is *task cohesion*, whereby the same set of principal tasks recur in subsequent periods but where there is little or no enduring cohort identity. Under this scenario it may be worthwhile to set up special training units around these enduring principal tasks, but with no expectation that the cities subscribing to those capacity building efforts will retain their cohort identities subsequently. The final polar case arises when neither cohort identities nor principal tasks endure from one period to the next. In this *reset* scenario, it is as though each new 5YP planning horizon begins anew, unencumbered by any past associations. While this allows for a fresh start each five years, it may pose a challenge for those who might seek to foster institutionalized learning over the longer time horizons spanning multiple 5YP periods.

Table 11 sets out the cross-tabulation showing the number of cities by cluster for both the 11th and 12th 5YP planning clusters. There were seven planning clusters for the 11th 5YP and six for the 12th 5YP, yielding 42 possible combinations for 286 prefectural level cities, for an average of just under seven cities per cell. If all crosstab cells had similar values [with "7" in most cells and "6" in a few others] that would point clearly to a "reset" scenario, using the terminology introduced above, indicating very little correspondence between the 11th and 12th 5YP clusters. In contrast, the strongest possible indication of "cluster cohesion" would be if each row of Table 4 had all zeros except for one cell, implying that all cities from within any given cluster from the 11th 5YP moved as a single cohort to the 12th 5YP. If in addition to that the principal task topics remained the same over those two planning periods for all cohorts, that would correspond to pure "stasis". More formally, we apply a chi-square test to the data in Table 4, yielding a contingency coefficient (Fisher's Exact Test) of 0.337, which fails to establish evidence of correlation between membership for the 11th and 12th 5YP planning clusters. This is evidence that planning clusters do not retain their identities across sequential Five-Year planning periods.

Having ruled out both the "stasis" and "cohort cohesion" scenarios, our final remaining task is to assess whether there is evidence of "task cohesion". For this we turn to Fig. 3, which lists the appropriate capacity building modules derived from this analysis and the preceding analysis by Heikkilä-Xu using identical methodologies. These are necessarily notional or interpretive, because they are rooted in a keyword analysis of hundreds of Five-Year Plans. As the connecting arrows suggest, there are some cases where the principal planning task emphases are similar across the 11th and 12th 5YPs. Not surprisingly, basic land use planning is prominently

**Table 11**  
The Number of Cities by 11<sup>th</sup> and 12<sup>th</sup> five-year plan Clusters

11th Five-Year Plan clusters		12th Five-Year Plan clusters						Σ
		One	Two	Three	Four	Five	Six	
1	3	5	9	4	9	4	34	
2	10	10	11	4	5	3	43	
3	4	5	6	2	6	8	31	
4	3	5	10	8	11	6	43	
5	9	4	9	12	6	4	44	
6	4	6	9	3	3	3	28	
7	7	3	19	12	12	10	63	
Σ	40	38	73	45	52	38	286	

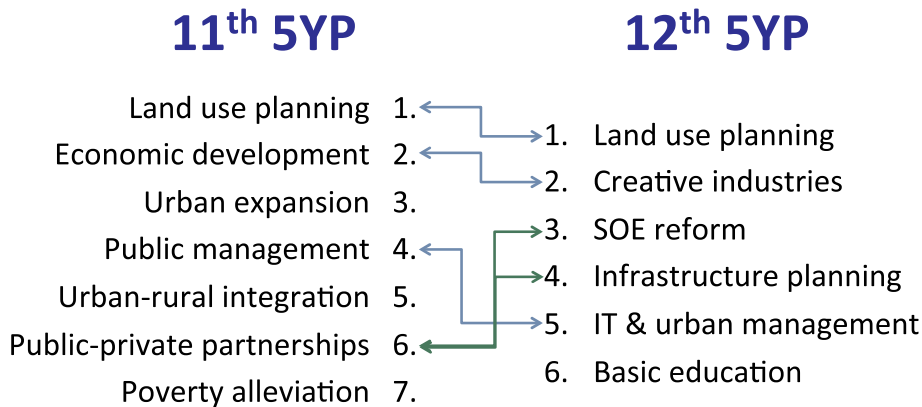


Fig. 3. The comparison of principal planning tasks in 11th and 12th five-year plans.

featured in both. Economic development is also, but in the 12th 5YP it is linked to the role of creative industries. Likewise, public-private partnerships are central to both 5YPs, but in the 12th 5YP it is embedded implicitly in issues of state-owned enterprise reform and infrastructure planning. Public management also appears to be an enduring planning focus across both 5YP horizons. Other topics, however, appear to be more ephemeral. Urban expansion and poverty alleviation are prominent in the 11th 5YP but not in the 12th, for example, while the reverse is true for basic education.

## 6. Recapitulation

This paper addresses the key challenge of how cities can learn from each other. The case study we employ is based on data drawn from China's Five-Year Plan experience, but the lessons learned are more broadly applicable. In fact, some of China's unique features actually provide clearer insights in certain cases for other settings as well. For example, if potential learning cohorts do not endure in China, where there is a relatively uniform approach to the 5YP process, such cohorts would be even less likely to endure elsewhere. It is analogous to the strongest person in the room being unable to lift an object – because that person is an outlier in that specific regard, we can infer that other people in the room would also be unable to lift that same object. Likewise, if Chinese learning cohorts do not endure, others likely would not do so either. Additionally, the Chinese case study is useful because we are able to gain valuable insights from the rich qualitative survey-like data contained in the 5YPs. Trying to develop similar case studies using survey data from elsewhere would be fraught with difficulties.

By applying our methodology to two sequential planning periods we are able to delineate four distinct learning cohort dynamics:

- **Stasis** – Where learning cohorts remain largely intact from one planning period to the next, and where the planning topics addressed also remain largely unchanged.
- **Cohort cohesion** – Where cohorts of cities emerging from the analysis are relatively stable from one 5YP to the next, but where the topics addressed by such cohorts evolve over time.
- **Task cohesion** – Where the principal planning tasks are relatively stable over time, but where the cohorts that emerge around these tasks do not cohere from one 5YP to the next.
- **Reset scenario** – Where neither the potential cross-learning cohorts nor the tasks themselves endure, in which case there is little to build upon from one 5YP to the next either in terms of planning topics or in terms of institutional cohorts.

Of these four distinct possible outcomes, our research supports the “task cohesion” scenario. The implicit cross-learning cohorts that emerged from the 12th 5YP bore no significant overlap with their counterparts from the 11th 5YP. If this so in China, it is even more likely to be the case in other settings where there is less top-down institutional guidance. This finding provides compelling theoretical support for an approach to cross-learning that emphasizes enduring planning themes rather than a reliance on learning cohorts.

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