

Developing China's West: producer services in metropolitan Xi'an

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Abstract:

China's maturing economy raises questions as to the convergence of urban-economic spatial patterns with those in developed countries. Three major components of producer services – financial, information consultancy and computer services – indicate the development of advanced economic functions that drive growth. This research assesses producer services in Xi'an, the biggest city in Western China. Methods include ArcGIS analysis of the spatial layout of service sector companies and interviews with corporate managers. Highly agglomerated sectors display different spatial characteristics resulting from the interaction of market demand, urban planning and government policy directing the growth and place of these tertiary functions.

Resumen. La economía China, en fase de maduración, plantea interrogantes en cuanto a la convergencia de los patrones espaciales urbano-económicos con los de los países desarrollados. Tres componentes principales de los servicios a la producción – financiamiento, consultorías de información y servicios de informática – sirven de indicadores del desarrollo de aquellas funciones económicas avanzadas que impulsan el crecimiento. Este estudio evalúa los servicios a la producción en Xi'an, la ciudad más grande de China Occidental. Los métodos incluyen el análisis mediante ArcGIS de la distribución espacial de las empresas del sector servicios y entrevistas con ejecutivos de empresas. Los sectores con una elevada aglomeración muestran diferentes características espaciales que resultan de la interacción de la demanda del mercado, la planificación urbana y las políticas gubernamentales para gestionar el crecimiento y la ubicación de estas funciones terciarias.

要約 中国経済の成熟化は先進国の都市経済空間パターンへの収束について疑問をもたらす。生産者向けサービスの主な3分野、金融、情報コンサルタントおよびコンピュータ・サービスは、経済成長をもたらす先進的な経済機能の発展を表す。本論文では、中国西部最大の都市西安の生産者向けサービスを検討する。評価方法としては、サービス・セクター企業の空間的配置のArcGIS分析と企業マネージャーへのインタビューなどを用いる。高度集積セクターは、市場需要との相互作用、高度機能の発展と配置を決める都市計画や政府の政策から生じる様々な空間的特徴を示す。

Keywords: Xi'an | producer services | urban spatial agglomerations | regional science | Chinese economy | economics | Western China

Article:

China's emergence as a global economic powerhouse raises two issues examined in this research: to what extent do Chinese intra-urban spatial economic patterns resemble those in more advanced countries, or whether the strong role of the central State yields a different outcome than in these early leaders by incentivizing particular developments due to top-down political goals. Research on international urban development frequently focuses on global cities at the top of the international urban hierarchy as well as major East coast cities in China where foreign direct investment (FDI) fuels development (Scott 1988; Sassen 2006; Shahid and Nabeshima 2010). A study of urban development in the Pearl River Delta proposed that a two track urbanization pattern prevails in Chinese cities, reflecting the degree of government and endogenous activity at work in each locale (Wong et al. 2003). The following research examines the advanced, high value added economic sector of producer services in one of inner China's major metropolitan centres for an indication of the role of market and government forces shaping the country's urban-economic patterns in numerous second tier cities outside major special economic zones and foreign investment areas.

Despite permitting a degree of enhanced urban autonomy and fostering an increasingly market-responsive economy, the Chinese State maintains a heavier hand in city and regional planning than is the case with countries in North America and Western Europe. This interventionist model was used by former leader Deng Xiaoping in referring to his economic reforms as 'socialism with Chinese characteristics'. Government planners – ranging from the central state to provincial and local authorities – set goals and create incentives to shape the decision-making and implementation process. The central hypothesis of this research, however, is that spatial location patterns of producer services firms within Chinese metropolitan areas strongly resemble those in more developed countries. The location of economic entities in newly developed hybridized urban areas indicates a similar underlying economic logic propelling convergence as the marketized economy works to lower costs and share the benefits of clustering firms and their service providers (McGee 2009), which in China is incentivized and selected by government planners.

A major indication of the maturation of an economy is the progressive shift of the proportion of jobs from primary (extractive) to secondary (manufacturing) and tertiary (services) sectors. High end producer service companies play an increasingly important role in the world economy. This reflects the growth in technology-related businesses that require greater amounts of high skill service functions within the firm as well as a heightened outsourcing of services (Lundquist et al. 2008). The emergence of this new economic sector creates jobs at the upper end of a new international division of labour (Froebel et al. 1980; Beyers 2002). The ensuing disruptive impact creates social change from the insertion of a global level skill into a local labour structure, accelerating the creation of income and class disparities inherent to modernization processes that are apparent across Asian cities (Hutton 2004).

Producer service firms tend to be smaller and more dispersed than manufacturing firms, causing the creation of new regions of clustered unevenness across the global economic landscape. Major centres of urban economic vitality such as Shanghai and Beijing along China's East coast attract skilled labour due to the presence of top universities and an abundance of amenities that are scarce elsewhere in the country (Han and Qin 2009).

Much less is known about developments in the far more numerous mid-size regional centres such as Xi'an, the largest metropolis in north central China. The city served as an ancient capital of China, anchor of the early Silk Road, site of the capture of Chiang Kai-Chek to compel opposition to the Japanese by a warlord in the 'Xi'an Incident', and recipient of technology transfer during the Third Line era. This paper focuses on the spatial location and functions of producer services in Xi'an to assess the effects of government-directed development policy seeking to accelerate maturation of the economic structure by encouraging growth of high value added functions in lagging regions. Figure 1 traces employment in the two major producer service sectors of telecommunications (TCS) and banking in Beijing, Shanghai and Xi'an from 2005–2008. While growth continued in all, specialties developed and remained constant – telecommunication services in the capital, banking in Shanghai, and a fairly even distribution in Xi'an that grew steadily but at a slower pace.

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Although the field of producer service studies is not new, examinations of the evolution and role of this sector in rapidly evolving economies outside the core developed states is scarce (Selstad and Sjaholt 2004; Short 2004). In the case of Xi'an a further factor concerns the lack of foreign direct investment as a spur to the presence of producer services. A major inland city, Xi'an serves as an example of a domestic sector evolving and maturing its own manufacturing-services linkages along with high technology and high level services. The extent to which Xi'an's urban economic base includes a producer services sector can be considered far more predictive of the country's development state than the economy in large East coast Chinese cities thriving on foreign investment inputs. As shown in Table 1, based on Chinese Statistical Yearbook statistics for the six cities shown (three East coast and three West coast leaders, respectively), with the

exception of the national powerhouse Beijing, Xi'an is comparable to other East coast leading cities in the proportionate strength of its tertiary sector's contribution to the city's GDP.

Table 1. Employees by industry sector (10,000 persons) and percentage GDP, 2008

District	Primary	Secondary	Tertiary	Tertiary (%)	GDP tertiary (%)
Beijing	2.6	140.24	427.42	75	76
Shanghai	1.21	159.71	216.30	57	59
Guangdong	.77	99.59	125.18	55.5	45
Chongqing	1.83	112.79	127.11	53	38
Xi'an	1.39	59.38	70.08	54	52
Chengdu	0.32	55.69	76.12	57.6	34 (Sichuan)

Source: All China Data Centre (<http://www.chinadatacentre.org>).

The success of China's central government policy to 'develop the West' by infusions of capital and trained labour to less developed areas holds major implications for the stability of this giant, rapidly growing Asian power. That this development policy was first proclaimed in September 1999 by the then Chinese premier in Xi'an emphasizes this city's importance in the eyes of the central government as a regional economic potential lighthouse. Xi'an is one of the seven major urban growth centres – three of which located in Western China – identified by a recent Deloitte and Touche study (Kwan and Knutsen 2010). Xi'an anchors the Guanzhong-Tianshui 'West Delta' triangle including Chongqing, the new terminus of the Yangtze River inland-to-ocean shipping route. The outcome of central government redistributive policies at the western edge of China's core region reveals the success of attempts to ensure a 'harmonious society', the motto of the previous Five-Year Plan, by scattering economically vibrant clusters across the country.

Major planks in the proposed 12th Five-Year Plan include accelerating the development of service industries, fostering 'strategic emerging industries' (such as information and communications technology – ICT), and putting in place a regional development strategy (Kwan and Knutsen 2010). This research examines whether the transition is succeeding, as demonstrated by the presence of producer services in Inner China continuing the economic evolution 'with Chinese characteristics' of strong government intervention in a new region. Theoretical contribution comes from illustrating at the municipal level how the actions of planners directing the construction of industry-specific producer service clusters fit existing models.

2 Theoretical framework

Observations of 'varieties of capitalism' within the international political economy open up room for case studies across and within countries to advance understandings of market-influenced processes in developed and developing countries and regions, permitting a "theorizing back" from the empirical to theoretical frameworks (Yeung 2007, p. 342). Studies of developments in China widely use this approach, usually focusing on case studies in particular metropolitan

centres to illustrate similarities and differences with prevalent models developed elsewhere. The impact of government policy on regional development within 'red capitalism' (Lin 1997) has largely been traced in the three leading East coast metropolitan regions centred in Beijing, the Yangtze and the Pearl River deltas. This research argues that something different – not just a lagging or early stage in a recognized cycle – may be occurring in Inner China.

China's departure from previous developed world patterns includes a lingering lag in the growth of services commensurate with its attainment of 'workshop of the world' manufacturing status, as well as a concentration in lower skill level producer service sectors (Lin 2005). An additional difference in China's path of services growth flows from its manufacturing dominance, with tertiary activity largely serving secondary sector needs rather than services to services as in the developed world (Li 2011). The role of the central government in setting policy and providing resources for its fulfilment suggests a key variable for Asian development theory.

A study of Korean patterns of spatial development over time traced a ladder of industrial restructuring through the emergence of a spatial division of labour and along a highway corridor of higher level businesses (Park and Koo 2010). Over time labour intensive-cost sensitive multinational companies left the country, while technology intensive domestic firms concentrated in the capital region. Producer service firms mirror the population shift and accentuate the role of ICT in providing a competitive advantage for metropolitan high technology firm clusters (Mack et al. 2011). Proposed as an Asian model of disparity gap widening and contracting, this study used producer services and population shifts to illustrate the playing out of a development cycle in a major Asian urban space economy. China's size and skill level range suggests that a similar model may be emerging.

2.1 Spatial agglomeration

The geographic nature of a cluster consists of closely located firms performing similar or related economic functions as demonstrated on a map of a particular area. Reasons for this pattern include the benefits of external economies from shared access to labour, transportation and related infrastructure (Hanson 2000). Higher order economic benefits accruing to proximate location often include information exchange leading to compliance with regulations and increasing innovations (Malecki and Moriset 2008). Underpinnings for these functions are predicted to come from trust-building frequent interactions encouraged by proximity (Asheim 2000). Agglomeration refers to the same spatial clustering of companies in an interactive association with one another that reduces costs and shares benefits (Malmberg 1996). The availability of a rare and desirable factor, such as broadband service as an amenity for knowledge-intensive firms that characterize the producer services sector in both highly developed countries such as the US or a unevenly developing country such as China tends to promote distance between clusters and promote agglomeration inside them.

2.2 Producer services and urban locations

There is no widely accepted definition of producer services. The term describes an industry sector that provides services to other types of enterprises and public service organizations, including financial, insurance and business services such as advertising, market research, accounting, legal services, consulting services and other intelligence services (Browning and Singelmann 1975). Business-oriented producer services contribute to the real value of the products sold to other producers, but not directly to consumers (Daniels 1985). Generally, producer service firms perform knowledge-intensive functions relating to business activities of other firms (Bryson et al. 2004). Development of producer services follows the widespread establishment and rapid adoption of a system of factory production and is inseparably connected with that of science and technology (Yan 2005). While producer services are not involved in material transformation, they perform an indispensable activity providing outsourced assistance for specialized functions connected with industrial production.

Spatial patterns of businesses and individuals employed in related occupations reflect two seemingly contradictory trends. An increased reliance on high technology infrastructure enables spatial diffusion, which is offset by a combination of the continuing human reliance on face-to-face communication and transaction cost savings from nearby location of business partners that build and bind agglomerations. The cost and complexity of producer services in particular favour their location in relatively large metropolitan areas. Highly trained, footloose knowledge workers with various job location choices favour the amenity rich environment of large cities (McKercher and Mosco 2007). Producer services are traditionally concentrated in the central business district (CBD) due to an ample labour market and better transportation connections. These factors reduce the cost of face-to-face exchange to the maximum extent for the maximum benefit (Scott 1988). Some studies of producer service location in US cities show evidence of an increasing concentration in the central core, especially of communication-intensive functions such as legal activities (OhUllachain and Leslie 2007).

However, the development of transportation and communication technology enables the spatial distribution of producer services to be both concentrated and dispersed (Lundquist et al. 2008). As in more developed countries, Chinese producer service firms frequently relocate to outlying urban fringe areas to enjoy lower business costs and a better environment than available in the urban centre (Ning and Hou 2002). Along with complete office facilities, transportation accessibility and car parks, the attractiveness of urban fringe zones for services functions underlies a growing spatial sprawl (Yan 2003). Different types of enterprises exercise different location choices depending on the location of their client firms. The export-oriented feature of producer services indicates the suitability of peripheral locations to provide for outlying clients, along with the interregional focus of specialized service provision shown by a high degree of agglomeration (Harrington et al. 1991). Producer services agglomeration in the city centre and diffusion in the suburbs co-exist, a pattern familiar in the West but new in Chinese cities. Transition to a more market economy combined with government directives dilutes the earlier

spatial pattern of production-centred services around small cores diffused throughout the city to the modern pattern of concentrated industrial park districts on the urban edge (Yi et al. 2011).

The following examination looks first at evidence for economic development of producer services in selected East coast and inner China cities. Focus then falls on a more detailed examination of urban economic patterns in Xi'an as an exemplar of metropolitan targets in the third front development frontier of major inner China second tier cities (Naughton 1985). The final section looks at spatial location patterns of the three major producer service sectors in Xi'an to compare with developed world urban theory at the inner metropolitan scale.

3 Methodology for Xi'an agglomeration study

This examination separates out and details firm and employment numbers in the financial, computer and information subsectors of producer services that predominate in Xi'an. China's contemporary pattern of services-prioritized urban growth seems to be converging with that of developed countries, characterized by an increase in foreign direct investment, per capita income and polycentric suburbanization reflecting state-market interactions (Gong 2002; Han and Bo 2009).

In order to reveal the patterns of sectoral spatial agglomeration in Xi'an, addresses of producer service firms were identified from Xi'an's 2008 Yellow Pages. Each firm location is displayed in the form of a point on the three maps produced using ArcGIS software. Through field investigation it was determined that most small and medium producer service companies influence other companies within an area of 150 metres. Based on this, buffer maps were developed for the three subsectors most prominent and active in Xi'an: (i) Financial services, including banking, insurance, securities trading, mortgage; (ii) Information consultancy, including advertising, notarization, accounting, law, auditing, statistics consultation and a social survey of consulting; and (iii) Computer services, including the software and processing industry, database services and computer equipment maintenance. Fifty telephone interviews, conducted with knowledgeable individuals in firms selected from each of the three categories, permitted more in-depth examination of location strategies. Specific questions covered areas such as the firm's founding data, reason for being in its current location and any prior location, percentage of employees and clients that are within the Xi'an metropolitan area, percentage within their area that are foreign firms, and actions of local/provincial/national entities that influence their locational well-being, such as urban planning and industrial policies, zoning, taxation and trade regulations. A matrix of responses permitted analysis of the most influential factors.

4 Sectoral concentrations of producer services in Xi'an

The basic study unit of Xi'an is divided into the city centre districts of Beilin, Lianhu, Xingcheng, Yanta, Weiyang and Baqiao. This division also includes remote rural areas such as

Lintong, Chang'an and Yanliang district, along with Gaoling, Lantian, Huxian and Zhouzhi County (Figure 2). Their population, size and density are provided in Table 2.

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Table 2. Xi'an political divisions, 2008

Urban district	Population	Area (sq. km.)	Density
Beilin	827,500	22	37,613.6
Lianhu	745,600	38	19,621
Xingcheng	644,300	36	17,897
Yanta	1,122,700	152	7,386.2
Weiyang	613,000	261	2,348.7
Baqiao	552,600	322	1,716
Yanliang	257,600	240	1,073.3
Lintong	679,000	898	756
Chang'an	1,020,000	1,583	644.3
Suburban/rural county			
Gaoling	286,300	290	987.2
Huxian	558,800	1,213	460.7
Lantian	520,000	1,977	263
Zhouzhi	547,800	2,956	185.3
TOTAL	8,875,200		

Source: Xi'an Municipal Statistics Bureau (2008).

Producer services are mainly concentrated in the central area districts of Beilin, Xingcheng and suburban areas of Yanta, which appear as a multi-core spatial structure. This pattern is similar to the results of a study of reconfigured Seoul, Korea which noted the spatial effect of high inter-firm network links between service firms in various sectors, and the reduced attraction of a crowded downtown for new service industries. This caused migration to outlying areas of new clusters along with linkages to older manufacturing districts (Park and Nahm 1998). Beilin and Xingcheng districts form long-standing agglomeration areas along with the new hi-tech Yanta District. Each producer services industry demonstrates a different location choice, yielding different spatial agglomeration characteristics within and bordering the main urban area. The following sections analyse in detail the location characteristics of the financial, information consulting and computer industry related services, responding to government guidance and common economic considerations of proximity to labour, customers and infrastructure links.

The major difference between the East coast urban powerhouses in the capital region (centred in Beijing-Tianjin), the Yangtze River Delta (centred in Shanghai), the Pearl River Delta (stretching from Guangzhou to Hong Kong) and the interior China example of Xi'an lies with the relative lack of foreign investment as a source for development. Chinese firms represent 90.7 per cent of companies in Xi'an's high-tech zone. Of the 5,101 producer service firms in Xi'an, only 842 (16%) were established before 1991. The remaining – particularly in telecommunications, computer related and technology intensive business services – sprang up in the following two decades. The Xi'an High-tech Industrial Development Zone was established in 1991, followed by the Economic and Technological Development Zone in 1994, reflecting national campaigns to develop the West through stimulating more technology intensive economic activity (Walcott 2004, 2007).

Government programmes such as Torch, Spark and other competitive grant schemes frequently furnish the capital for promising companies who attract and retain local talent, particularly in targeted specialties such as high technology related fields. According to interview evidence, 98 per cent of the employees in Xi'an high tech park developments graduated from local Xi'an universities, though their hometowns may be some distance away. In the category of producer services, all levels of technology and financial service greatly increased. Table 3 provides a breakdown as of 2009 for firm types in the three major parts of producer services in Xi'an: financial, information and computer related. These statistics demonstrate that financial, information consultancy and computer service firms are mainly located in urban areas, converging with developed world patterns. Figure 3 traces their growth over the preceding decade, demonstrating the increasing lead of the information technology specialty in particular.

Table 3. Producer service firms in Xi'an, 2009

	Financial services	Information consultation	Computer services
Urban area	1229	858	797
Main urban area	887	819	782
Urban (%)	72%	95%	98%
Source: Xi'an Post Office (2009).			

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From 1997 to 2006, the industrial output value of the service industry increased from \$8.113 billion to \$25.85 billion, with an average annual growth rate of 13.74 per cent, exceeding that of traditional service industries with an annual growth rate of 0.74 per cent. In particular, after the year 2000, the industrial output value of the service industry experienced an annual growth rate of 17.68 per cent, while the traditional service industry yielded an annual growth rate of only 13.81 per cent. The output value of producer services also grew more rapidly than did traditional service industries (Xi'an Municipal Statistics Bureau 2009).

4.1 The financial sector

The modern metropolitan area functions as a command centre containing the headquarters of financial institutions with a high level of decision-making authority that tends to concentrate in the city centre (Li 2002). In addition, the financial and insurance industry branches and sub-branches are mainly engaged in the processing, reporting and personal services. A high degree of face-to-face exchange is needed, so closeness to customers constitutes the major location choice factor.

The spatially agglomerated financial industry concentrates in Xi'an's south and southwest (see Figure 4). It forms a dense zone following the north-south and east-west axis along two main streets in the ancient city (CBD) where major financial institutions traditionally located. A cluster of financial service firms in the west corresponds to a large concentration of textile companies in an industrial park. Another cluster in the northwest sector of the city, also at the inner edge of the Third Ring Road, results from the Xianyang suburban local system planning. The central northern edge cluster corresponds to the new Xi'an Science Park.

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In addition, apartments for financial sector workers are concentrated between the southern edge of the Second Ring Road and the outer high speed ring road. This area falls within the High-tech Development Zone and the university research areas, so is readily accessible to both and features attractive amenities. Distribution characteristics confirmed by interviews demonstrate that considerations of convenience for access to good flows of traffic and information are the main factors of location selection in the financial industry. Concentration distribution in the University Scientific Research Area and the High-tech Development Zone shows that the financial services sector provides external support functions in enterprise activities. Producer services cater to their related business customers, so closely located enterprises play a major role in location choice. Municipal policy calls for creation of Xi'an as a regional financial centre. To do this, the Urban Plan for the next decade calls for speeding up the construction of a new city centre and financial business district in order to attract more domestic and foreign financial organizations to settle in Xi'an. Constructing a systemic framework of venture capital, industrial and equity investment, and regulating the development of diversified forms of ownership for small and medium-sized bands, securities and fund management companies are anticipated as part of a new, enabling legal infrastructure.

4.2 The information consulting sector

Success in the information consulting industry requires using the most current information and state-of-the-art design. Being close to information sources and information infrastructure therefore form the main factors in location selection. Convenient access to transportation and

industry are also very important according to interviewees. Firms in the information consulting sector concentrate in the city centre commercial district, the University Research Area and the High-tech Development Zone, along a north-south roadway axis (see Figure 5).

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The High-tech Development Zone contains a large number of related enterprises which need the services of the information consulting. These enterprises within the university research area contribute important sources of information. The ancient walled city (CBD) and the longitudinal axis form the centre of Xi'an's commercial district. Its prosperous business environment attracts an information consulting agglomeration that is similar to that of the financial sector agglomeration areas mainly due to their location choice factors of convenient transportation and quick information access, which promote strong spatial interdependence.

4.3 The computer service sector

In comparison to the previous two sectors, the spatial agglomeration of computer services is the highest due to the faster product update speed that computer services requires for more accurate information. Spatial agglomeration promotes the exchange of information, with obvious benefits for the computer services sector (see Figure 6).

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Computer services in Xi'an spread outside the city centre, concentrating principally in the high-tech zones and university research areas. This is because compared with the previous two types of producer services, computer services are less dependent on face-to-face exchange. It is thus easier to break away from the city centre to locate in more peripheral areas. In the High-tech Development Zone, computer services mainly cluster along Keji Road and Gaoxing Road. Xi'an High-tech Development Zone established a range of special areas including: Pioneer Park; Software Park; Environmental Protection Science and Technology Park; Xi'an Jiaotong University Science and Technology Park and Northwestern Polytechnic University Science and Technology Park. They are all ranked as national professional science parks, and thus attract a large number of high-tech industries.

In the University Scientific Research Area (USRA), Yanta Road features a concentration of electronic product retail stores. Computer services are most intensive in that location, similar to the evolution of Beijing's Zhongguan'cun district. Establishments in the USRA include the Shaanxi Bureau of Surveying and Mapping, Xi'an University of Architecture, Xi'an University of Science and Technology and many other university affiliated scientific research institutions. Nearby retail outlets include Saga Computer City, Cyber City of Computer, East New Trade Computer City, Red Square of Science and Technology and many small companies. Computer service industries gather here since many units derive from universities and scientific research institutions so seek to stay in close touch with these spill-over centres. Industrial users are also

denser here. The potential services market is large due to the USRA's richness in high quality human resources.

In general, the CBD contains concentrations of producer service sectors in finance and insurance, real estate and information consultancy services. The more recently developed Yanta District features computer application services, scientific research and comprehensive technical services, along with telecommunication and transport services. Spatial agglomeration characteristics of producer services in Xi'an are mainly decided by the interaction of market demand, urban planning and policy guidance. Sector-specific firms in the traditional CBD reflect developed world patterns for their location in proximity to the firms needing their services, as seen in studies of North America and Europe (Nelson 1986; Coffey 2000). The next section discusses evolving policy applications based on these patterns.

5 Policy implications

Several distinctive elements complicate a comparison of China's situation with patterns seen in developed world cities. These include constraints on personal mobility imposed by the system of household registration (hukou). This system requires an individual to apply for permission for relocation, coupled with constraints on the location of businesses imposed by government policy. Government policy to concentrate and co-locate human and physical resources provides a way for grouping businesses needing specialized skills with universities providing related training. Hukou can be transferred to a non-hometown location on the basis of a job, anchoring talent, training and employment via directed and co-ordinated policy applications.

A lack of appreciation for the important impact of services on the economy flows from their intangible nature, unlike that of manufacturing (Daniels 1998). Markets play a leading role in the allocation of resources, with demand reflecting the need for a product or service, stimulating its supply, promoting the formation of producer services clusters and optimizing industrial structure. However, China's pattern of market socialism leaves a large role for various levels of government to play in shaping the political economy, translating global forces through national policy directions (Daniels 2005). Government policies can accelerate the pace of development of economic activities, particularly in locations with insufficient endogenous capital and/or foreign investment. Government affects the economic and social interests of individuals or groups of different economic activities through setting financial policies. For example, the government formulates the development policy of the services industry and adjusts the tax policy of related industries, which influences economic behaviour.

The gap between China's prowess in manufacturing and its far less developed services sector reflects problems that are political as well as economic, such as the need for government incentives to attract officials to promote producer service sectors that give low short-term return on investments but lead to high long term results (Li 2011). Policy recommendations to remedy this situation include the development of government incentives to educate officials as to the

interlinked importance of producer services to support manufacturing and raise output value, promulgate targets and provide resources to reward developing processes and products. These currently are at work in demonstration districts located in leading East coast metropolitan areas. Their success could be used to incentivize adoption and adaptation to other regional leaders such as Xi'an.

Government action can also directly build industrial parks to attract a large number of enterprises to a particular district. The Xi'an High-tech Industrial Development Zone was the first state-level high-tech development zone approved by the state council in 1991. A series of preferential industry-oriented policies promotes the growth and agglomeration of a large number of outstanding high tech enterprises, creating a sufficient market for the convergent development of producer services in Xi'an. Several examples from the autumn of 2010 illustrate the effects of actions such as the national government's award of 35 million RMB for the construction of a producer services district promoting entrepreneurship in the Xi'an High-tech Zone (China Daily 18 October 2010). Indeed, government attention to major urban centres in the west such as Xi'an, Chengdu and Chongqing is critical to spurring their development as demonstrated by their take-off since the turn of the millennium following proclamation of the 'develop the West' policy.

Growth in Xi'an's southern area is linked to where the city's new universities, high tech and office parks concentrate. As a result, producer services are more intensively distributed there. Most of the producer services and knowledge-intensive industries are not highly responsive to the price of land and labour, but they clearly react to the level of transaction costs. High demand needs face-to-face interaction, which contributes to the financial and information consulting industry agglomeration in the city centre. Otherwise, the need for face-to-face interaction is less than that for knowledge and skills, seen in the concentration of computer services in the University Research Area and High-tech Development Zone. Incentivizing their co-location was a major contribution of government economic development planners.

Urban planning performs an important guiding function for the expansion of urban spatial structures by co-ordinating urban economic, spatial and social activities. Planning guides and standardizes urban construction and the spatial structure of producer services. In the Xi'an Economic and Technology Development Zone (ETDZ), for example, producer service companies dominate and account for 35 per cent of the ETDZ's annual output due to outsourcing activity. The two functional areas of 'business R&D' and 'producer services' include offices, low rent apartments, data centres, training facilities, a centre for computing and other public technology facilities. Industrial development applications encompass industrial design, e-commerce and digital logistics, software and information services and customer contact centres. The Xi'an service outsourcing industrial park, located in the city's economic development zone, includes professional working and living communities to accommodate 50,000 residents. Office facilities are targeted for electronic information, software and information services, data and disaster recovery services, digital energy and intelligent electric grid development, semiconductor lighting and solar photovoltaic cell development, avionics repair and servicing. A

city-level area in northern Xi'an, the Economic Technology Development Zone has grown rapidly since 2007 when the municipal government relocated there from the old walled city. This provides a good example of municipal government influence on the spatial pattern of producer services nested within new parts of Xi'an.

The financial and information service industries located further from the city centre than did computer services since Xi'an urban policy protects the historical centre city. Development of modern office buildings is restricted in the CBD, which in other places usually contains producer services firms. According to the Xi'an Urban Plan (1995–2010), the main direction of development in Xi'an lies in the southern part of the city. The Urban Master Plan of Xi'an 2004–2020 projects that by 2015 a full 42 per cent of GDP and 65 per cent of urban employees will come from the services sector, with the addition of 100 large scale service enterprises. Of this total, 55 per cent is forecast to come from producer services, with a 5 per cent average annual growth rate.

The future urban development model of Xi'an can be characterized as a chequerboard pattern of nine squares, in an internally networked centre city with six cores. The southwest, north of the Weihe River and the northeast direction are favoured for rapid development. Summarizing the preceding three figures detailed by sectors (Figures 4–6), currently producer services are mainly located in the south of the city, between the Second Ring Road and around the city-circling high speed road in order to maximize access to transportation and corporate customers. These patterns are products of market demand and government policy guidance at the metropolitan level, as shown by interview responses that transportation and communication access constitute critical factors in high level service company location decisions. Shared markets by information and computer companies that comprise the bulk of producer services spur the need for clusters with good access to customers, thus prioritizing policy for developing infrastructure links among related production enhancing components.

6 Conclusion

Work by scholars on producer services in China focuses almost exclusively on the East coast metropolitan areas of Beijing, Shanghai and Guangzhou. The main contribution of this research comes from an examination of three leading producer services sectors in Xi'an to see whether development patterns in a major inner China metropolis follow theory predictions based largely on market driven models from more developed countries, a Chinese pattern based on leading East coast areas fuelled by foreign investment, or another pattern reflecting particular place or underlying economic characteristics. Xi'an's urban economic development as revealed in this study of producer services indicates that even though foreign direct investment is largely absent – a major distinction from forces propelling growth along the eastern seaboard cities – infusions of financial and policy advice from the central government along with university spillovers constitutes a sufficient base for the development of sectoral agglomeration patterns similar to those in more mature cities.

The extent of China's economic maturation is revealed by the regional shift in the leading indicator sector of producer services from the coast to inland urban centres. China's strategy of tertiary service sector development relies on the usual Asian interventionist state mechanism of encouraging policies promoting particular types of economic development in targeted locations where it is felt that they are most likely to succeed. Such policies differ basically only in degree from the interventionist state-led policies of Japan and the Asian Tigers (Taiwan, South Korea, Hong Kong and Singapore).

Xi'an's agglomerated producer services' sectors show the 'Chinese characteristics' of strong government intervention to create land use supporting this desirable sector, resulting in amenity living and shopping areas that attract and hold workers close to clustered employment areas. The location of producer services is highly concentrated in the south and southwestern districts of the city. Different industries show different location concentrations. The financial and information consulting industries are concentrated in the city centre. Computer services gather in the High-tech Development Zone and the University Research Area. The spatial agglomeration characteristics of producer service industries reflect the interaction of market demand reducing distance to customers, urban planning placing economic activities in particular city sectors and government policy encouraging the growth of high value added functions, for example, producer services. In short, the dual-track model proposed earlier reappears in another area of China but under the same political-economic context of urban policy supporting concentrated residential, retail, amenity and intellectual spillover zones.

A Chinese model of urban economic spatial concentration exists throughout the country that differs from that in previously developed countries primarily in the role of the central government rather than private capital in creating spaces and designating where certain economic functions will exist. However, spatial strategies propelling close customer-service provider clustering encourages convergence in both cases. The phenomenon of clustering of similar economic functions remains the same, as the newly marketized economy works to lower costs and share the benefits listed in previous studies of agglomeration effects. Convergence with developed world predecessors in producer services can be seen in the concentration of producer service subsectors in urban periphery locations specifically designed to attract and hold firms utilizing their sophisticated functions. This movement also links with relatively new provisions for targeted support of land use, residence, transportation and amenity needs related to this sector featuring a high proportion of knowledge workers.

A set of questions for further research could address the impacts of government mandated initiatives in developing countries such as China compared to the location and function of producer services in more market-driven developed countries. This research contributes to the latter endeavour, as well as providing an in-country comparison of this important growth-promoting sector in larger Chinese cities. Long term studies might also track the role of producer services by comparing China's manufacturing-led growth with that of India's services-led

development. Producer services thus holds great potential as an important area for economic geographers interested in national and international development trajectories.

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