

# EVOLUTION AND DEVELOPMENT OF GUANGZHOU-HONG KONG CORRIDOR

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**ABSTRACT:** With its rapid development in the past two decades, the Pearl River Delta has become one of the most developed regions in China. During this period, an important corridor between Hong Kong and Guangzhou has emerged and shaped the spatial structure of the region. The growth of this region has been greatly marched with the twin poles of Guangzhou and Hong Kong, and the economic and social development has taken place in a corridor between these two metropolises. This paper provides an analysis of the significance of this corridor in terms of its infrastructure, population, land use, and economic development. Massive infrastructure construction in the corridor has played an important role in its development. The corridor has high-frequency transport, and each transport mode has contributed in a different way to the process of development of the corridor. With high land use intensity and high population density, it is developing the characteristics of a megalopolis. As a pathway of connection between Guangzhou and Hong Kong, the corridor includes not only physical infrastructure, such as roads, railways and airports, but also logistics operations, human resources, information and capital, which plays important roles in accelerating business development. It demonstrates how this Main Street has become one of the most important factors in regional development.

**KEY WORDS:** corridor; regional development; evolution

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## 1 INTRODUCTION

The concept of the corridor has a long history in the urban and regional research. Because of its great importance and impacts, research on corridors has received growing attention of geographers. Studies have ranged from the theoretical underpinnings (WEBBELL, 1969; CAO and YAN, 2003b; PRIGMUS and ZONNEVELD, 2003), to case studies (YEATES, 1975, 1991), and to planning and design (GAKENHEIMER and MEYER, 1990). Emphasis has been placed on corridor infrastructure, the morphology of land use, the process of urbanization and economic development at many scales, from international level to regional and urban ones. More recently, a new concept, the megacorridor, has been put forward (ALBRECHTS and COPPENS, 2003; DE VRIES and PREMUS, 2003). Corridors are convergence places of transactions and spatial accumulation in a buffer space between articulation points, hub centers of multimodal transportation networks. Corridors have

several basic features: 1) dense population, 2) large cities or cluster cities and intense mixture of land use, 3) well-developed infrastructure of transport, etc. Corridor plays an important role in development of regional economy, always acting two functions: one is convergence, and another is divergence.

Since the 1980s, the Pearl River Delta (PRD) has grown to be one of the most developed regions in China, with a rapid growth in the number of cities, an ever-increasing density of cities, and a rapid regional integration (YAN *et al.*, 1997). The spatial structure of this region has changed as well, with the emergence of a linear corridor stretching between Guangzhou and Hong Kong. In this corridor, the spatial transport connection has reached an outstanding level (CAO and YAN, 2003a, 2003c). Urban development has been focused along two axes: "one along National Road 105 and the main railway between Guangzhou and Shenzhen, and another along National Road 107 between Guangzhou and Zhuhai (HU *et al.*, 2003). This region makes an

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excellent case study for the impacts of corridor development on infrastructure, population, land use and economic development.

The Pearl River Delta (PRD) consists of 15 cities or districts or city at county level, including Guangzhou, Shenzhen, Foshan, Zhuhai, Jiangmen, Dongguan, Zhongshan, the Huicheng District, Huiyang District, Huidong County, Boluo County of Huizhou, the Duanzhou District, Dinghu District, Sihui County of Zhaoqing and Gaoyao. Hong Kong and Macao may be also considered as parts of the region. The growth of this region has been greatly marked between the twin poles of Guangzhou and Hong Kong, and the economic and social development has taken place in a corridor between these two metropolises. This corridor may be defined by mouth of the Zhujiang River to the south, the northern part of Guangzhou to the north, and Zengcheng to the east. The Guangzhou-Shenzhen Highway, National Road 107, Provincial Road 203 and Guangzhou-Kowloon Railway comprise the main axis. There are seven town-level areas, including Xintang Town, Shapu Town, Xianchun Town, Shitan Town, Shanjiang Town, Yonghe Town and the Tech-economic Development Zone in Zengcheng. The total area of the corridor is 9631 km<sup>2</sup>, and is 160 km in length from north to south and 50 km from east to west. It thus comprises 22.56% of the total area of PRD.

## 2 TRANSPORT CONNECTION AND LAND USE EXPANSION

This corridor has high frequency transport. Since the 1980s, the percentage of the freight and passenger transport in this corridor to the PRD had kept on increasing from 34.73% in 1980 to 63.59% in 2000. Despite the inflation in the freight transport, the percentage always remains to the level of over 60%. Both of the freight and passenger transport in the corridor make up of 2/3 of the transport in the whole PRD (Table 1).

Table 1 Percentage of Guangzhou-Hong Kong corridor to PRD in freight and passenger transport (%)

	1980	1985	1990	1995	2000
Passenger	34.73	37.35	53.50	50.61	63.59
Freight	67.53	65.54	70.79	60.71	66.50

Sources: Bureau of Statistics of Guangdong Province, 1981, 1986, 1991, 1996, 2001

Each transport mode has contributed in a different way to the process of development of the corridor. For instance, the percentage of the railway transport experiences the trend from decline to growth, the air transport

remains stable in a level state, of which the air transport of freight is unique in the PRD, and the passenger transport is also dominant, while the transport through water changes frequently with the decline in both freight and passenger transport (especially passenger transport) (Table 2).

Table 2 Passenger and freight transport of Guangzhou-Hong Kong corridor through different transport modes (%)

		1990	1995	2000
Railway	Passenger	100.0	8.6	90.3
	Freight	100.0	78.4	87.6
Air	Passenger	100.0	99.5	98.9
	Freight	100.0	100.0	100.0
Water	Passenger	68.7	26.4	23.4
	Freight	77.1	70.0	55.1

Massive infrastructure construction in the corridor has played an important role in its development. Major road developments include National Road 107, Provincial Road 203, Guangzhou-Shenzhen Highway. The Guangzhou-Kowloon Railway has been upgraded, and three new international airports have been built at Guangzhou, Shenzhen, Hong Kong. In addition, three international seaports have been built at Shenzhen, Guangzhou, Hong Kong. In 2002 major roads in the corridor had a combined length of 9540 km, and accounted for 28.5% of the whole PRD road network. This growth is reflected in the increasing road net density in the corridor, which grew from 34 km/100 km<sup>2</sup> in 1980 to 136 km/100 km<sup>2</sup> in 2000, with a growth rate being much higher than that of whole PRD (Table 3).

Table 3 Road network density in Guangzhou-Hong Kong corridor and PRD (km/100 km<sup>2</sup>)

Year	1980	1985	1990	1995	2000
Corridor	34	44	51	120	136
PRD	25	27	34	42	76

The greatest network integration exists in the inner part of the corridor. This is particularly evident in the case of the railways. There are 60 express trains between Guangzhou and Shenzhen, with an average of one train every 16 minutes during operating hours. In addition there are 20 daily express trains between Guangzhou and Kowloon.

The corridor is a region of high land use intensity. The land used for construction in the corridor had increased from 1339 km<sup>2</sup> in 1990 to 2100 km<sup>2</sup> in 2000, the percentage of which accordingly has increased from 44.65% to 52.48% to the whole PRD. At the same time, the percentage of the land used for towns and cities to the

whole PRD has increased from 60.79% to 65.61% , among which the land used for country residential development has increased from 36.39% in 1990 to 40.70% in 2000 . Special notice should be paid to the development of the land used for industry and transport, and for the movement and relocation of the inner city industries (Table 4 ).

Table 4 Percentage of different lands for construction  
in Guangzhou-Hong Kong corridor to PRD ( % )

Year	1990	1995	2000
Town development land	60.79	62.23	65.61
Country residential land	36.39	25.55	40.70
Industry & transport land	33.66	30.38	31.92
Construction land	44.65	48.46	52.48

Urban growth has been greatest along the Guangzhou-Shenzhen section of the National Road 107 and the Guangzhou-Shenzhen Railway, that has produced a marked spatial belt form of development. A large proportion of development has occurred within a radius of 1 kilometer from the road (HU *et al.* , 2003 ). The pattern also holds true for the area along the Guangzhou-Shenzhen Railway which has tended to integrate part of central and northern Shenzhen and Dongguan and the western and southern part of Guangzhou (ZHANG *et al.* , 2003 ). The result has been a very rapid expansion of a number of new towns and cities, while older towns and cities located on or near to the main road and rail connections have experienced similar urban expansion.

The infrastructure of transport has direct impact on the development of the land use in towns and cities. At the very beginning of the development period, foreign investment played a very decisive role in the development of towns and cities in the region. Under the condition of the local municipalities' limited funds, the early foreign investors sought to locate their business in those districts that had the most convenient transport facilities. That gave an initial advantage to those towns and cities that were located along the main lines of transport and facilitated their development. In this TOD (Transit-oriented development) mode for the development of towns and cities, transport became the most crucial factor in changing the land use pattern in those towns and cities in the corridor. But the economy of corridor developed further, transport did not play as decisive a role as before (CAO and YAN , 2003b).

3 FEATURES OF POPULATION DISTRIBUTION

This corridor has a very high population density. While accounting for only 22.56% of the area in the whole of

PRD , it contained 63.12% of the population in 2000 . Within the corridor, there are several cities and districts whose population exceed  $1 \times 10^6$  , such as the Tianhe and Haizhu districts in Guangzhou, Longgang and Baoan districts in Shenzhen, as well as Hong Kong (Fig. 1-Fig.3). The average density of this corridor was 3182 persons/ $\text{km}^2$  , but there are several districts whose population density is in excess of  $10 \times 10^3$  persons/ $\text{km}^2$  , including Shilong County in Dongguan, Luohu District in Shenzhen, Futian District in Shenzhen, Haizhu District in Guangzhou, Dongshan District in Guangzhou, Yue-xiu District in Guangzhou and Liwan District in Guangzhou. This corridor had a population density of 39 569 persons/ $\text{km}^2$  (Fig.4 ). This corridor is developing the characteristics of a megalopolis. Much of the corridor is highly urbanized, with an average level of urbanization of 78% . Only few districts have the level less than 30% .

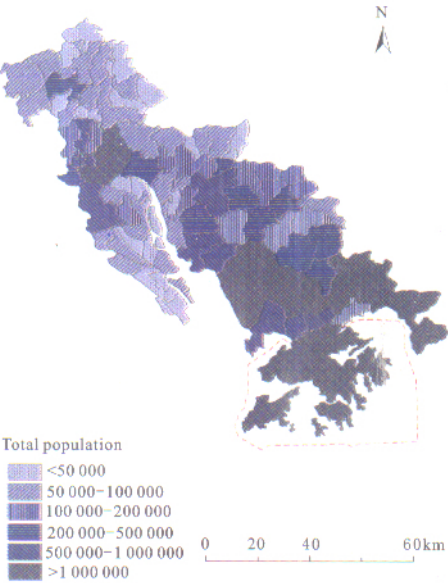


Fig. 1 Total population in Guangzhou-Hong Kong corridor

4 SPATIAL DISTRIBUTION OF ENTERPRISES IN CORRIDOR; "CASE STUDY OF DONGGUAN CITY

The corridor is a pathway of connection between Guangzhou and Hong Kong, which includes not only physical infrastructure, such as roads, railways and airports, but also logistics operations, human resources, information and capital. The corridor path plays an important role in shaping business development. In order to explore the pathway in more details, Dongguan has

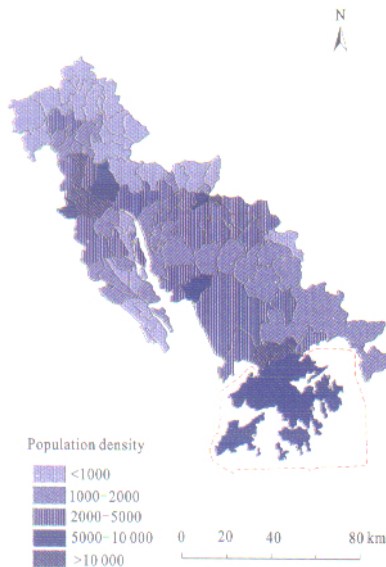


Fig. 2 Density of population in Guangzhou-Hong Kong corridor

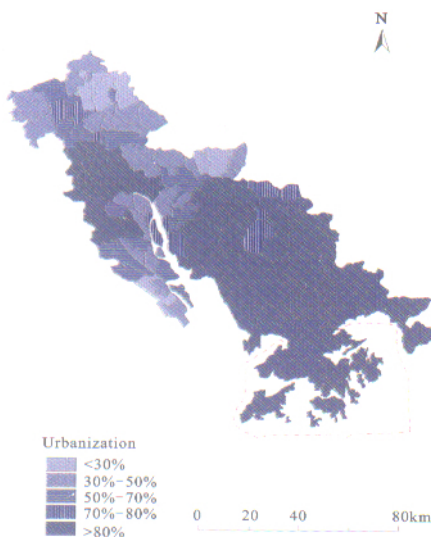


Fig. 3 Urbanization level in Guangzhou-Hong Kong corridor

been selected as a case for study. It is one of the most important nodal cities within the corridor, with 31 097 enterprises registered in the *List of Enterprises in Dongguan, 2002*. The breakdown of these firms into various categories is found in Table 5.

Among the seven kinds of industries mentioned above, the three kinds of I, V, VII, which consist of most of the service and relative industries, especially the manufactory industries of electronic equipment and the computer-relative manufactory industries, have the biggest scale in numbers, and take up the percentages of the whole enterprises as 33.22%, 20.01% and 33.14% respectively. They serve as the backbone industries.

Table 5 Percentage of different enterprises in Dongguan City (%)

	I	II	III	IV	V	VI	VII	Total
Number	10331	609	2208	1339	6224	81	10305	31097
Percentage	33.22	1.96	7.10	4.31	20.01	0.26	33.14	100

Note: I, means business, technology and residential services; II, entertainment, tourism, hotel services; III, architect, real state, decoration; IV, education, science, communication welfare and culture; V, commerce, shopping, CBD services; VI, Agriculture; and VII, industry.

The lowest in percentage is the kind of agriculture enterprises with only 0.26%. Seen from Table 5, the manufactory industries and the relative industries also have a large scale. The density per square kilometer of the enterprises in Dongguan is 12.6. The spatial distribution of those enterprises is irregular and imbalanced. Almost all kinds of enterprises agglomerated in a few developed districts and counties such as Dongguan proper, Houjie Town, Chang'an Town, Humen Town, Tangxia Town and Fenggang Town, while the rest of the towns have dispersed distribution (Fig. 4).

The enterprises in Dongguan seem to be impacted more by the outer districts instead of the developed districts within itself. Dongguan proper is the most densified district of the distribution of enterprises, however, it does little help to the development of the counties around it, such as Chashan Town, Shilong Town, Wanganidun Town, Daomiao Town and Zhongtang Town, and the numbers of enterprises in those counties are of sharp decrease compared to the number in the city proper. On the other hand, those counties that adjacent to Shenzhen, such as Chang'an Town, Dalang Town, Fenggang Town and Tangxia Town, are the counties that agglomerate most of the enterprises. So to this point, this thesis comes to the conclusion that the outer impact of the distribution of enterprises in Dongguan is more significant than the inner district within itself.

## 5 CONCLUSIONS AND DISCUSSION

In the above research and discussion of the corridor, this thesis finally comes to three important points.

(1) This corridor is the belt district of infrastructure promoted by the convenient transport facilities. In such corridor, the construction and timely update of the transport infrastructure bring great advantages in its development, since the burden of transport in this district keeps transport congestion and dislocation out of its way.

(2) This corridor is the main street in the regional eco-



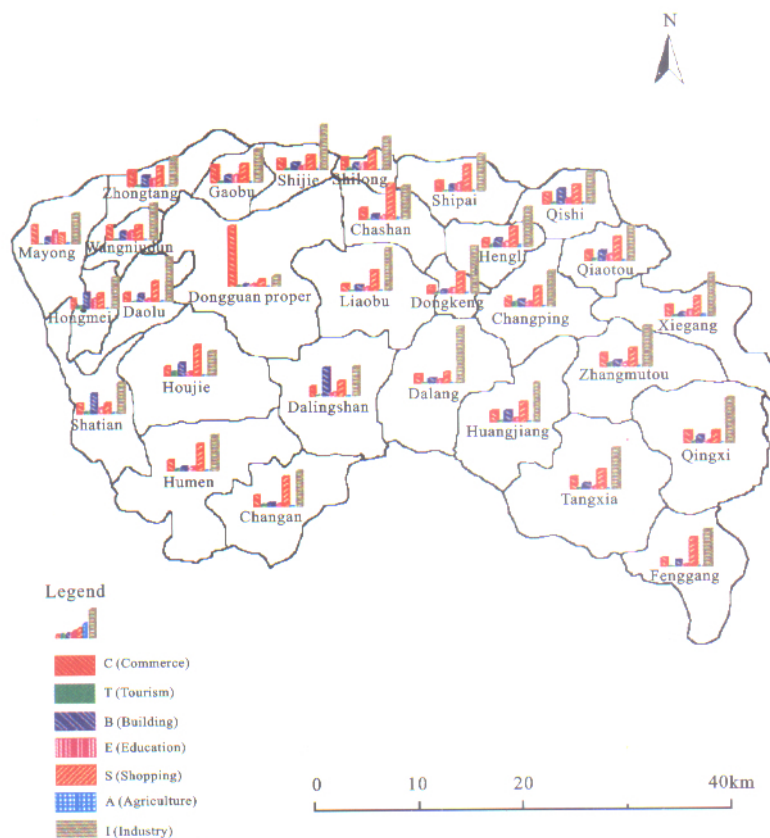


Fig. 4 Spatial distribution of the enterprises in Dongguan City

economic development. Different districts with different economic functions have rational spatial distribution according to the available network of infrastructure.

(3) This corridor serves as the axis of regional urbanization as well. The network of infrastructure, which is the foundation of the work and life in towns and cities, literally figures out the direction of urbanization and the development of residential space. To this point, it is pretty safe to say that, urbanization will develop along the belt districts where the network of infrastructure actually lays out. As a result, the development of the corridor will certainly lead to the belt development urbanization from one city centre to another. One thing that also should be mentioned is that the strategy of spatial development has something to do with the whole process. To sum up, this corridor has developed into the main street in the regional social and economic development.

Despite all the advantages of the corridor mentioned above, this thesis also keeps an eye on all kinds of challenges coming its way. Compared with the corridors in developed countries in terms of the corridor design and Great Plan for corridors that have already been applied, the structure of construction and governance of corridors, and their function to serve the better regional de-

velopment, the corridor discussed in this thesis, which formed at the beginning with the "from the bottom to the top" mode, is still greatly in need of scientific planning, construction as well as governance to the policy level.

The main challenges facing the corridor can be as follows.

(1) How to coordinate different systems within the corridor itself? This remains a problem, especially in the corridors with megalopolises, that the corridor will have to cross several different administrative municipalities. In order to realize the smooth development of the whole corridor, compromises have to be reached among different administrative bodies, municipal government of different levels as well as all kinds of government policies.

(2) How to coordinate long-distance transport and short-distance transport? To solve this problem, two transport modes are proposed, for instance, to install certain charge of travel fees of the long-distance transport, and the same method may also apply to the short-distance transport during the daily rush hours. The purpose of the method is to achieve the greatest potential of the transport infrastructure facilities.

(3) How to reinforce the connection of the structure of cities and the network of transport? This problem mainly deals with the rational and scientific location of the residential districts and working districts in cities, which also has something to do with the accessibility to the nodal cities of the corridor, as well as the water and green land distribution of the cities.

## REFERENCES

- ALBRECHTS L, COPPENS T, 2003. Mega corridors: striking a balance between the space of flows and the space of place [J]. *Journal of Transport Geography*, 11(3): 215–224.
- Bureau of Statistics of Guangdong Province, 1981, 1986, 1991, 1996, 2001. Guangdong Statistical Yearbook [R]. Beijing: China Statistical Press. (in Chinese)
- CAO Xiao-shu, YAN Xiao-pei, 2003a. Features of transport connection in the Pearl River Delta [J]. *Human Geography*, 18(1): 87–89. (in Chinese)
- CAO Xiao-shu, YAN Xiao-pei, 2003b. Research on development of transport corridor in the 20<sup>th</sup> century [J]. *City Planning Review*, 27(1): 50–56. (in Chinese)
- CAO Xiao-shu, YAN Xiao-pei, 2003c. The impact of the evolution of land network on spatial structure of accessibility in the developed areas: the case of Dongguan City in Guangdong Province [J]. *Geographical Research*, 22(3): 305–312. (in Chinese)
- DE VRIES J, PRIEMUS H, 2003. Mega corridors in the north-west Europe: issues for transnational spatial governance [J]. *Journal of Transport Geography*, 11(3): 225–233.
- GAKENHEIMER R, MEYER M D, 1990. Urban transport corridor planning [A]. In: DIMITROU H T (ed.). *Transport Planning for Third World Cities* [C]. Cambridge: MIT Press. 319–347.
- HU Weiping, YANG Guo-qing, WU Zhi-feng *et al.*, 2003. Studies on recent built-up land-cover change of urban area in the Pearl River Delta [J]. *Geographical Research*, 22(6): 780–788. (in Chinese)
- PRIEMUS H, ZONNEVELD W, 2003. What are corridors and what are the issues? Introduction to special issue: the governance of corridors [J]. *Journal of Transport Geography*, 11(3): 167–177.
- WHEBELL C F J, 1969. Corridors: a theory of urban systems [J]. *Annals of the Association of American Geographers*, 59(1): 1–26.
- YAN Xiao-pei, GUO Jian-guo, HU Yu-bin, 1997. A study on the dynamics of Guangzhou-Hong Kong-Macao Megalopolis [J]. *Geographical Research*, 6(2): 22–29. (in Chinese)
- YEATES M, 1975. *Main Street: Windsor to Quebec City* [M]. Ottawa: The Macmillan Company of Canada Limited.
- YEATES M, 1991. The Windsor-Quebec Corridor [A]. In: BUNTING T, FILION P (eds.). *Canadian Cities in Transition* [M]. London: Oxford University Press, 179–208.
- ZHANG Wen-zhong, WANG Chuan-sheng, LU Xin *et al.*, 2003. Coupling relationship between land use change and industrialization & urbanization in the Zhujiang River Delta [J]. *Acta Geographica Sinica*, 58(5): 677–685. (in Chinese)