

Digital Empowerment of Governance System Innovation in Guangdong-Hong Kong-Macao Greater Bay Area Urban Agglomeration

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The governance of the Guangdong-Hong Kong-Macao Greater Bay Area urban agglomeration has cross-border and cross-system characteristics. The development of the digital age and increasing competition in metropolitan areas have left urban agglomeration in urgent need of innovation in their governance systems. Digital empowerment is a means of technological change that acts on the development of things, through digital support, Integrating inter-governmental coordination governance, common market governance, refined social governance, and cultural integration governance throughout the governance system of the Guangdong-Hong Kong-Macao Greater Bay Area urban agglomeration, to enable the Guangdong-Hong Kong-Macao Greater Bay Area to adapt to the development of the digital era, cope with an external governance environment fraught with uncertainties, meet the diverse governance needs of urban agglomeration, and achieve integrated regional development. This paper explores the innovative path of digital urban agglomeration governance with characteristics of the Guangdong-Hong Kong-Macao Greater Bay Area, in order to better promote the development of modernized governance in urban agglomeration.

Keywords: digital empowerment, urban agglomeration governance, governance system

Introduction

With further globalization and integration, the rapid economic growth, the rapid expansion of the total population, and the growing size of towns and cities, have driven changes in the governance of urban agglomeration.

As seen in the development models of China's three major urban agglomerations, inter-governmental collaboration is more helpful than market-driven and locational advantages in breaking the shackles of administrative boundaries and becoming the endogenous driving force of urban agglomeration development (Suo, 2016). However, factors such as shortage of governance resources, lagging supporting systems, poor governance

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processes, imbalanced governance structures, and decentralized governance hinder effective inter-governmental collaboration (Yu & Dai, 2018). There is an urgent need for urban agglomeration governance system to break out of the inherited paradigm and strive to adapt to the challenges of the 21st century (da Cruz, Rode, & McQuarrie, 2018). Jin and Wang (2014) believe that repeating the majority game and designing effective regional contracts is the best way to resolve the inter-governmental “prisoner’s dilemma” and promote effective collaboration among city governments. Zhang (2021) proposed that building a modernized urban agglomeration governance system in which government, enterprises, and social organizations participate in collaborative governance is the key to top-level design in the effective governance of urban agglomeration.

As a special global cross-border and cross-governance Bay Area, within the institutional environment of “one country, two systems”, in what ways can cooperation be made more efficient and create a world-class urban agglomeration with great institutional advantages and competitiveness? Some scholars have proposed to build a digital intelligence governance system to modernize urban governance, and to meet the drivers of technological change, the uncertainty of governance ecology, the complexity of governance issues, and the diversity of governance needs (Chen, 2022). “The rise of new generation information technologies, such as big data, 5G, cloud computing, blockchain etc. and the transformation of the global governance system” (Dai & Bao, 2017, pp. 21-27), making digitally empowered urban agglomeration governance a new direction for change. In recent years, the widespread use of digital tools is driving the field of digital governance in urban agglomeration as a new topic for the study of innovative practices in urban agglomeration governance systems. Digital empowerment of urban governance can continuously promote innovation in urban governance and governance institutional mechanisms (Dong, 2020).

The development of a world-class urban agglomeration in the Guangdong-Hong Kong-Macao Greater Bay Area urgently needs digital tools to help overcome the governance challenges arising from differences in institutional mechanisms, let digital empowerment drive the governance of urban agglomeration to achieve inter-governmental collaborative governance, common market governance, refined social governance, and cultural integration governance, exploring a new pattern of building a governance system for the Guangdong-Hong Kong-Macao Greater Bay Area urban agglomeration.

Analysis of Realistic Demands

The uncertainty of the governance environment, the diversity of governance needs, and the integration of regional cooperation, co-drive digital empowerment for governance in the Guangdong-Hong Kong-Macao Greater Bay Area Urban agglomeration, to achieve the modernization of governance system construction.

Adapting to the Digital Age

Digital development is accelerating the process of regional integration. Nonetheless, Hong Kong and Macao have not formed interoperability for integrated public affairs services with Guangdong Province. As a pioneer in digital urban governance, the United States has gone through two stages of development: “smart city construction” and “smart city management”, and believes that creating a new type of urban governance alliance may become the future development direction of digital urban governance (Fang, 2021). Hence, using digital tools to actively expand government services in Guangdong, Hong Kong, and Macao and form an interconnected development model is the best way to enhance the effectiveness of governance in urban agglomeration.

Addressing the Complexity of Governance Environment

The complex and volatile external environment is prone to multiple crises such as social disorder, market economy regression, and government department failure, which affect the sustainable development of the Guangdong-Hong Kong-Macao Greater Bay Area urban agglomeration. It is mainly reflected in two aspects. Unexpected events, such as public health events, natural disasters, bring to the Guangdong, Hong Kong, and Macao governments emergency management linkage, economic cooperation, social stability, and other aspects of the challenge. And the accompanying reversal of economic globalization has intensified the unilateralism and the local protectionism.

Meeting the Diversity of Governance Needs

According to incomplete statistics, the resident population of the Guangdong-Hong Kong-Macao Greater Bay Area has reached more than 70 million people. Faced with the “big city disease” of unreasonable spatial distribution of population, to make the spatial allocation of high-quality public resources more balanced (Yang, 2021), is an urgent issue that needs to be addressed now. Digital governance can achieve internal empowerment of government organizations and external public empowerment, with the help of information technology, citizens can easily participate in the government decision-making process (Wang, 2019), and promote the transformation of urban agglomeration governance to digitalization.

Achieving the Development of Regional Integration

In the future, China’s economy will move towards a more coordinated, higher quality, and more competitive regional integration, which needs to rely on urban agglomeration as an important carrier (Yao, Chi, Liu, He, & Zeng, 2018). Hong Kong and Macao within the policy of “one country, two systems”, compared with Guangdong, their administrative barriers still exist, and multiple layers of governance overlap, resulting in poor coordination and interface between government departments. Multi-Level and multi-level government departments need to adapt to the requirements of integrated urban agglomeration governance as soon as possible, by using modern technology to accelerate the pace of transformation.

Digital Development Status and Dilemma

Since China’s 14th Five-Year Plan, “Accelerating Digital, Development Building Digital China” has become the new goal and direction of the Guangdong-Hong Kong-Macao Greater Bay Area; the construction of digital urban agglomeration is also being stepped up.

Digital Development Foundation and Practice of Urban Agglomeration

At present, Guangdong, Hong Kong, and Macao have launched digital development-related measures, and there are certain results.

The foundation of digital construction. (1) Policies support. The development of the digital economy cannot be achieved without the effective support of policies. Guangdong earlier proposed the IoT development plan for rapid economic development. With the widespread use of digital technology, Hong Kong and Macao have also launched “digital” policies to promote the construction of smart city (Table 1).

Table 1

Policies Support for the Digital Development of Guangdong, Hong Kong, and Macao

Region	Policy name
Guangdong Province	“Guangdong Province Internet of Things Development Plan (2013-2020)”
	“Guangdong Province New Generation Artificial Intelligence Development Plan (2018-2030)”
	“Guangdong Province to accelerate the development of 5G industry action plan (2019-2022)”
	“Three-Year Implementation Plan for Promoting Emerging Infrastructure Construction in Guangdong Province (2020-2022)”
	“Guangdong Province to Build a National Digital Economy Innovation and Development Pilot Area Work Methods”
	“The 14th Five-Year Plan for the Reform and Construction of Digital Government in Guangdong Province”
	“2022 Work Points of Digital Government Reform and Construction in Guangdong Province”
	“Digital Economy Promotion Regulations in Guangdong Province”
Hong Kong SAR	...
	“Hong Kong Smart City Blueprint”
	“Hong Kong Smart City Blueprint 2.0”
	“FinTech 2025” development strategy”
Macao SAR	...
	No. 2/2020 “E-Government” Law
	No. 24/2020 “Regulations on the Implementation of e-Government” Administrative Regulation
	...

Data source: Compiled from government websites.

(2) The digital industry continues to grow. The Guangdong-Hong Kong-Macao Greater Bay Area has 20 of the world’s top 500 companies. There are about 43,000 national high-tech enterprises, including Huawei, Tencent, Goodix, and ZTE, R&D resources and patent resources are dense, driving a rapid rise in the digital economy.

(3) Digital human resource pool (Figure 1). At present, the Guangdong-Hong Kong-Macao Greater Bay Area has more than 400,000 skilled talents engaged in scientific research; more than 25% have an international education and more than 30% have a graduate degree or higher.

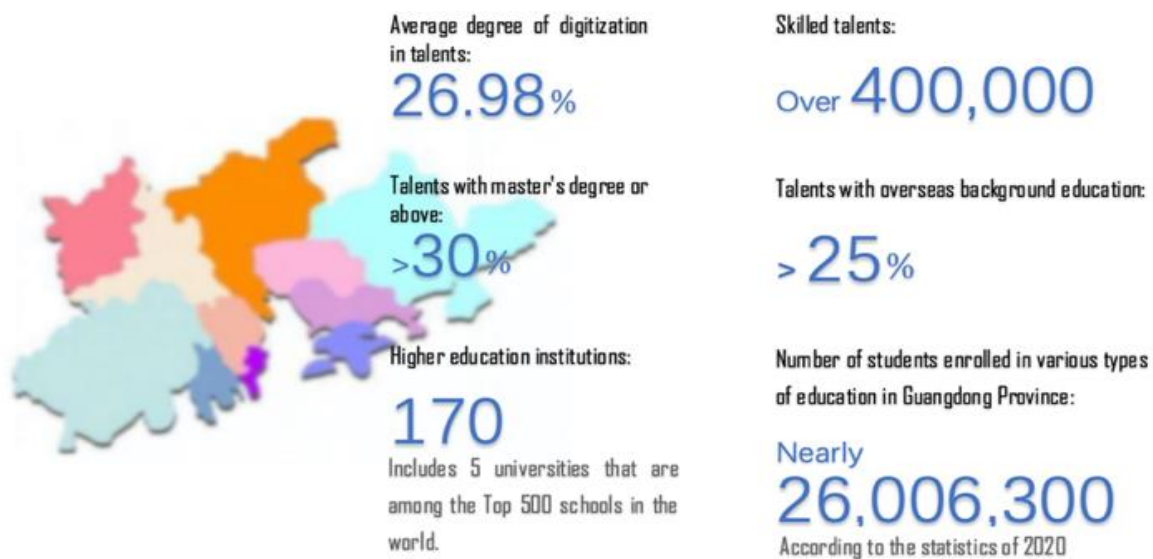


Figure 1. The digital talents pool in the Guangdong-Hong Kong-Macao Greater Bay Area (elaborated by the authors).

The effect of practice. Guangdong Province makes full use of digital technology in the role of government services. Relying on the WeChat APP, the “Yue saves trouble” mobile government service platform was developed, covering nearly 1,190 high-frequency livelihood services such as housing and property purchase, public security, human resources, education, and health; The “Yue Business Link” enterprise-related mobile government service platform provides 275 high-frequency services such as business start-up, business permit, and export tax refund for tens of millions of business entities in Guangdong province, realizing one-stop electronic processing of government services.

The Hong Kong Special Administrative Region is actively promoting the development of e-government, launching the GovHK website (DATA.GOV.HK), to provide more convenient public services to the citizens. According to the *2021 Guangdong-Hong Kong-Macao Greater Bay Area Open Government Data Report*, in 2011, HoRecently, in order to prevent and control the epidemic, the “Travel Safe” APP is launched to assist the citizens travel scientifically.

The Macao Special Administrative Region Government and the Water Services Bureau, in cooperation with the Macao Water Supply Company, have used the “Internet+” to promote the development of intelligent water services, setting up an intelligent water supply management platform, “Aquadvanced”, to improve the planning of pipeline projects. In the area of epidemic prevention and control, the “Macao Health Code” has been introduced to assist the citizens in their travels, and electronic consumption vouchers have been issued to expand domestic demand and revitalize the economy.

The Dilemma of Digital Governance in Urban Agglomeration

Despite the success of digital development in the Guangdong-Hong Kong-Macao Greater Bay Area, the level of digital synergy between Guangdong, Hong Kong, and Macao is still not high, bringing many governance bottlenecks to the political, economic, social, and cultural integration of the urban agglomeration.

Differences in institutional mechanisms. The Guangdong-Hong Kong-Macao Greater Bay Area is a cross-border cluster of cities involving different institutional backgrounds. The process of governance in the Guangdong-Hong Kong-Macao Greater Bay Area urban agglomeration, the unified leadership of the central government, the autonomy of the local government, and the high degree of autonomy of the Hong Kong and Macao SAR governments (Xue & Wu, 2022) constitute a multi-level subject, that it is difficult to make the interface and synergy between the governments of Guangdong, Hong Kong, and Macao.

Regional market segmentation. In the past 20 years of cooperation, the economic exchanges between Guangdong, Hong Kong, and Macao are very frequent, and have formed a “Guangdong-Hong Kong-Macao metropolitan economic circle”. Furthermore, as with other urban agglomeration development issues, between Guangdong, Hong Kong, and Macao Bay Area cities there are also disorderly competition, the same industrial structure, regional division of labor, and not obvious cooperation, regional duplication of construction, and other phenomena (Shi, 2014). It influences the economic development of urban agglomeration and is detrimental to the further opening of the regional common market.

Inadequate social integration. The social welfare and social service systems in Hong Kong and Macao are relatively well developed, in discrepancy with Guangdong’s social policy, therefore, it causes difficulties in the interface of social policies between Hong Kong, Macao, and the nine cities in the Pearl River Delta. Limited

resource space caused the spatial carrying capacity and social service carrying capacity of Hong Kong and Macao to be weaker than that of Guangdong, so the reciprocal opening of the three places at the social level needs to be further discussed and studied (Yan & Wang, 2019).

Multi-cultural coexistence. The cultural soft power is not only a prerequisite for the coordinated development of regional economy and society, but also an important guarantee for the sustainable development of urban agglomeration. Guangdong, Hong Kong, and Macao share the same historical and cultural roots, and have a common deep cultural structure and its spatial representation (Yu & Guo, 2022). As well, for intra-urban agglomeration, cultural differences can bring obstacles to synergy at the political, economic, and social dimensions in terms of cultural identity and cultural mentality.

Suggestions for Innovation and Optimisation

Digital empowerment refers to the empowerment of specific people through digital tools such as big data, mobile internet, and artificial intelligence, so that they can acquire corresponding life skills and survival capabilities (Mäkinen, 2006). “Empowerment” usually means to empower or energize, from the public administration perspective, digital empowerment is a technical tool that acts on the development mode of things to enhance the efficiency of the subject. Through digital empowerment, inter-governmental coordination governance, common market governance, refined social governance, and cultural integration governance are integrated into the governance system of the Guangdong-Hong Kong-Macao Greater Bay Area urban agglomeration, covering innovation in five areas: institution, mechanism, policy, model, and service (Figure 2).

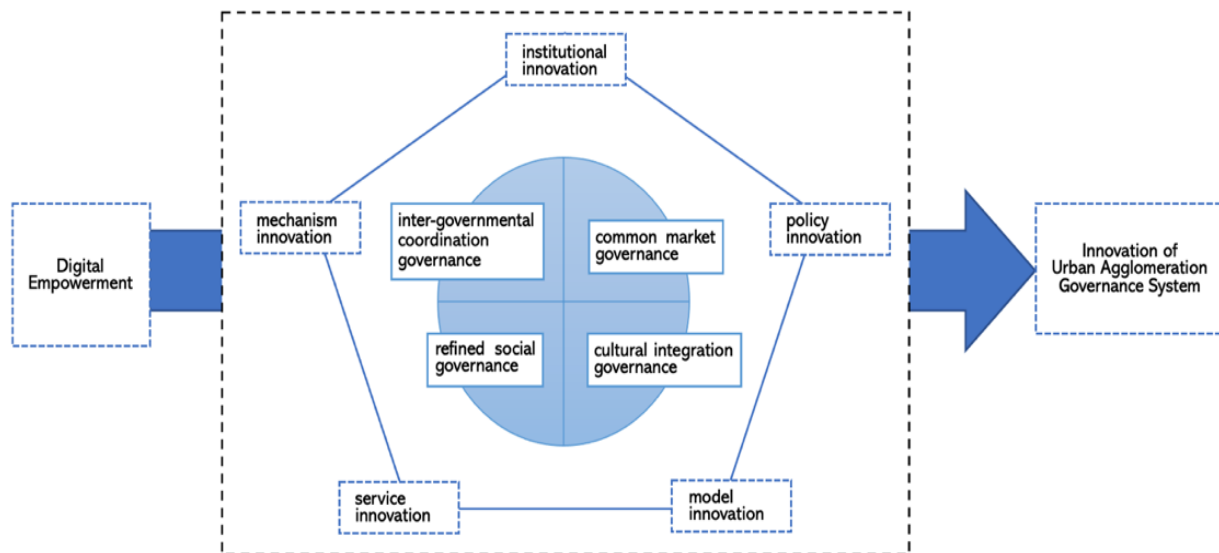


Figure 2. The framework of digital empowerment for the governance system of Guangdong-Hong Kong-Macao Greater Bay Area Urban Agglomeration (elaborated by the authors).

Inter-governmental Coordination Governance

Effective collaboration among city governments is the key to high-quality development of city clusters. Through the digital means of data, intelligence, and networking, we promote the formation of “collaborative digitalization” and “digital synergy” in inter-governmental governance (Huang et al., 2022).

The core driving element in the field of digital governance is the data itself, which has certain economic externalities and positive externalities that emphasize the social benefits derived from the data, data are also non-rivalrous, it can drive incremental returns to scale for the overall economy (Liu, 2021). For data-driven local government governance behavior, its role is to emphasize the positive effect of technology support, scale efficiency, and institutional innovation (Suo, Kan, & Chen, 2021). A more modern urban aggregation development strategy is based on a digital analysis of “cost-benefit-risk-assessment”.

The application of digital technology can realize the implementation and feedback mechanism of “Resident-Organization-Policy” to deal with the complex governance issues of Guangdong-Hong Kong-Macao Urban Agglomeration. Nonetheless, local governments may conceal the information for strategic purposes and personally gain from it (Shresthaha, 2008). It is necessary to rely on the data meta-system, to formulate a practical benefit sharing mechanism to ensure effective synergy in inter-governmental governance.

Common Market Governance

Building a common market is an important foundation for achieving market integration in the Guangdong-Hong Kong-Macao Greater Bay Area Urban Agglomeration.

To promote the coordination of interests and win-win cooperation among cities by common market rules, and to form an economic community of urban agglomeration of industrial clusters, advanced mathematical technology is used to penetrate into the “inner” supply-side structure to reverse the mismatch between finance and the real economy (Chen, 2022). In the current context of “reverse globalization” and Western countries’ intention to “decouple” from China’s industries, large domestic urban agglomerations have to take up the responsibility of building a complete national industrial chain and creating a world-class regional industrial chain supply chains center (Wang, 2020). Technology misuse, privacy protection, and failure risks associated with digital technologies increase the technical complexity of urban governance (Sancino & Hudson, 2020), and constrain the economic development of urban agglomerations. Only by continuously promoting the integration of common market governance into the digital wave will we be able to anticipate potential risks and effectively address existing risks in a timely manner.

Refined Social Governance

The fundamental aim of social governance in urban agglomerations is to make life better for residents. At present, the mega-population size brings difficulties in the interface between social governance and inter-city government service systems in urban agglomerations.

Digital technology provides better insight and responsiveness to social needs, and through data carving, can respond more precisely to the needs of the people (Hou, Liu, & Tao, 2020). Cities should provide diverse, human-machine integrated service channels and methods to diverse citizens, and then give the choice to citizens, who will choose online or offline services according to their digital capabilities, specific service scenarios, and needs (Zheng, 2021). “Nurturing smart citizens and transforming them from consumers to participants” (White, Zink, Codecá & Clarke, 2021, p. 103064), citizens use data as a driving force to empower society, enhance the ability and willingness of multiple subjects to participate in social governance, and promote the formation of a social governance community (Yu & Fan, 2022). Government departments use modern information technology such as artificial intelligence and the Internet of Things to establish a precise response mechanism for social governance,

taking the realization of residents' needs as the starting point and ultimate destination of social governance, so as to transform "rough" governance thinking, meet the expression of multiple interests, and enhance personalized services (Xue & Wu, 2022). Guangdong, Hong Kong, and Macao governments use big data platforms and other technical means to promote the standardization of refined social governance in the Guangdong, Hong Kong, and Macao Greater Bay Area city cluster, which can meet social needs, safeguard social rights and interests, coordinate social relations, guide social behavior, solve social problems, improve social security, promote social justice, prevent social risks, optimize the social environment, obtain the best social order, and promote social civilization, harmony, and security and stability (Tian, 2020).

Cultural Integration Governance

The deep integration of diverse cultures is a cornerstone of the modernization of the governance capacity of urban agglomerations.

Modern technology provides technical support for the governance of cultural integration in the Guangdong-Hong Kong-Macao Greater Bay Area Urban Agglomeration. During the transition from high speed to high quality of economic development, the high quality development of digital culture industry is the right thing to do in the new stage of building a strong cultural nation, enhancing cultural soft power and improving people's sense of cultural access (Xie & Chen, 2021). Because of the normal development of COVID-19 epidemic-prevention, it is necessary to fully grasp the potential of digital cultural consumption, accelerate the construction of digital infrastructure, and realize the development of cultural industry in the "cloud" of the Guangdong-Hong Kong-Macao Greater Bay Area. The government can use artificial intelligence technology to build online cultural consumption venues, satisfying the growing cultural needs of residents in urban agglomeration.

Discussion and Further Research

Innovation in the governance model of the Guangdong-Hong Kong-Macao Greater Bay Area Urban Agglomeration is the key to enhancing world competitiveness and influence. As the most advanced governance tool available, digital technology can help urban agglomeration to achieve deeper inter-governmental synergies, a regional common market, social refinement, and deep cultural integration. In the following research, the author will focus on the "common market" and how digital governance can drive the formation of a common market, and continue to explore the mechanisms and pathways behind the establishment of a common market, using the Guangdong-Hong Kong-Macao Greater Bay Area as an example.

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