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Case Study

Policy review towards the transitions of regional development of digital governance in China: The case of Guangdong-Hong Kong-Macao Greater Bay (2013–2023)

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Abstract: The central government of China has intensively guided regional integration and policy coordination towards the development of digital governance in the last ten years. The Guangdong-Hong Kong-Macao Greater Bay was one of the most important regions of China expected to accelerate regional development through policy coordination and establishment of digital infrastructures. This article adopted the method of content analysis to explore the policy transitions of digital governance in the Greater Bay including policy contents (in terms of policy objectives and instruments) and policy networks. Based on our empirical analysis, we found that top-down guidance from the central government did not necessarily generate regional coordination. Different governments of the same region could start policy coordination from shared policy objectives and policy instruments and establish innovative governance frameworks to achieve consensus. Therefore, regional coordination could be fulfilled.

Keywords: Guangdong-Hong Kong-Macao Greater Bay Area; digital governance; policy networks; policy objectives; policy instruments; policy transitions

1. Introduction

The central government of China has intensively guided regional integration and policy coordination towards the development of digital governance in the last ten years. Since the 13th Five-Year Plan (2016–2020) and 14th Five-Year Plan (2021–2025), China's central government clearly encouraged local governments to construct digital infrastructures within individual cities and at the same time facilitated policy coordination across cities which would eventually contribute to industrial innovation as well as economic growth of the whole region (Chen et al., 2023). According to the long-term policy planning of the central government, the Guangdong-Hong Kong-Macao Greater Bay (shortened to be the Greater Bay) was one of the most important regions of China expected to accelerate regional development through policy coordination and establishment of digital infrastructures (State Council, 2019).

This article systematically reviewed the policy transitions of the Greater Bay as the region representatively portrayed the progresses and experiences of regional evolution of digital development in China (The Guangdong-Hong Kong-Macao Greater Bay was established upon the foundations of existing regional coordination of the Pearl River Delta. Since 2003, the central government of China has signed the Closer Economic Partnership Arrangement (abbreviated as CEPA) with the Hong Kong Special Administrative Region and the Macau Special Administrative Region.

In 2004, in the seventh joint meeting between Hong Kong and Guangdong, the two governments also agreed to strengthen coordination with each other and research for further cooperation in the Pearl River Delta in order to pursue common interests. The horizontal coordination between different governments on the provincial-level has been initiated in the region for long time. Yet, no official mechanisms for regional coordination was established on the provincial-level in the Pearl River Delta in the 2000s. The Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area announced by the central government in 2019 in fact confirmed the encouragement and guidance of the central government to accelerate regional coordination in the Pearl River Delta. This article thus reviewed the policy transitions before and after the implementation of the Outline Development Plan for the Guangdong-Hong Kong-Macao Greater and analyze the influence of the central government on the actual regional coordination). Indeed the Greater Bay was established upon multi-level governance networks constituted by 11 cities with divergent political systems. While Hong Kong and Macao were the overseas Special Administrative Regions with specific institutions of each other, Guangdong Province totally followed the domestic institutions of mainland China and governed 9 cities of the Greater Bay, i.e., Guangzhou, Shenzhen, Zhuhai, Foshan, Huizhou, Dongguan, Zhongshan, Jiangmen and Zhaoqing. Among the 9 cities, Guangzhou and Shenzhen were the most developed ones embedded in the economic and political cores of Guangdong Province. Compared with other regions such as Yangtze River Delta and Beijing-Tianjin-Hebei which thoroughly operated the domestic institutions of mainland China, the diversity of political systems embedded in the Greater Bay was the most unique character which distinguished the region from other counterparts in China. Previous studies have set up the initial comparisons towards the policies of digital governance in different countries (Chung and Kim, 2019) or explored the variables which influenced the implementation of digital governance among different governments (Puentes-Poloche et al., 2023). However, few studies have systematically reviewed policy transitions of digital governance in China especially the policy evolution in the particular Chinese regions such as the Greater Bay. To fulfill the gaps of existing research, we adopted the method of content analysis to explore the policy transitions of digital governance in the Greater Bay of China. We followed the analysis of Sabatier and Mazmanian (1979) and divided the policy transitions into two sections: policy contents (in terms of policy objectives and instruments) and policy networks. To explore the complex processes of policy transitions in the Greater Bay, we not only investigated the transitions on the provincial-level among Hong Kong, Macao and Guangdong Province but also included the survey on the municipal-level of Guangzhou and Shenzhen which intensively drove the changes of policy networks in different periods of time.

The rest of the article are organized as the following. Section 2 narrated the research method. Section 3 analyzed the transitions of policy contents in terms of policy objectives and instruments. Section 4 explained the evolution of policy networks. Section 5 discussed the article.

2. Research method

We adopted content analysis as the research method. As described by Wimmer and Dominick (2013), content analysis was the research method which used quantitative data to analyze the research objects and obtain empirical results which demonstrated or rejected the original research hypotheses. As the theme of this article explored the policy transitions of digital governance in the Greater Bay through scrutinizing large amount of policy documents, we considered content analysis as the suitable research method to generate solid results which contributed to the understanding to the theme of this study. In order to enhance the reliability for the operation of the method of content analysis, this article followed the suggestions of Elo and Kyngas (2007) and deployed three phases for content analysis, i.e., the preparation phase, the organization phase, and the reporting phase. The preparation phase must determine the data collection and sampling strategy, and the organization phase involved classification and interpretation, and the reporting phase should report the results systematically and logically. The processes of the preparation and organization phases were shown in this section, and the results obtained in the reporting phase were discussed in sections 3 and 4.

2.1. Data sources and collection

We firstly collected policy documents issued by the local governments on the provincial-level of Hong Kong, Macau and Guangdong Province as well as the documents on the municipal-level of Guangzhou and Shenzhen. The policy documents of Hong Kong and Macao were collected through the official websites of the governments of Special Administrative Regions in Hong Kong and Macao, their subordinate departments, and the legislative and judiciary institutions such as Legislative Assembly of Macau. The keywords searched were “digital government”, “smart city”, “e-government”, “digitization”, and “big data”. We also searched for the policy documents of Guangdong Province and the two cities of Guangzhou and Shenzhen through the database of Beida Fabo which gathered the majority of policy documents in China. The keywords searched in Guangdong were the same as those of Hong Kong and Macao. As there were more institutions involved in the insurance of policies in Guangdong, we only selected the policy documents which were issued by the People’s Government of Guangdong Province, its subordinate departments, the Guangdong Provincial People’s Congress, the People’s Government of Guangzhou City, and the People’s Government of Shenzhen City. The dates for the insurance of these policy documents should be from 2013 to 2023. Moreover, to ensure the comprehensiveness of the policy documents in Guangdong Province and the two cities, we further checked the official websites of these institutions based on the search of the Beida Fabo to reconfirm the origins of these policy documents.

We further assured the validity and representativeness of the final policy samples by screening the collected policy documents according to two criteria. First, the main contents or at least part of the contents of the policy documents were closely related to digital governance. Second, the policies must be officially issued by the institutions of Hong Kong, Macao, Guangdong Province and the two cities of Guangzhou and Shenzhen, eventually we obtained 83 valid policy samples, including 61 samples

issued by the institutions of Hong Kong, Macao, Guangdong Province on the provincial-level, and 22 samples issued by institutions of Guangzhou and Shenzhen on municipal-level.

2.2. Coding processes and classification

We followed the suggestion of Hsieh and Shannon (2005) and decided codes through the identification of key concepts and variables embedded in the research theme. As the theme of this article explored the transitions of policy contents, we identified the codes of policy objectives and instruments based on the existing literature. For policy objectives, we referred to the studies of Vogler et al. (2016) and Spangenberg (2004) and classified the codes into 6 categories, including improve administrative efficiency, increase transparency and so on. For policy instruments, we referred to Rothwell and Zegveld (1985) and divided policy instruments into 11 categories, containing infrastructure, personnel training, etc. **Table 1** showed the codes from A–Q and the operational definitions of each code. The codes from A–F represented the analytical categories of policy objectives, and the codes from G–Q presented policy instruments.

We then imported the 83 samples into the software of Nvivo12 in term and counted the frequencies of each category. For the analysis of transitions of policy contents on the provincial-level, we only imported 61 samples issued by the institutions of Hong Kong, Macao, Guangdong Province. Only when we portrayed the policy networks across both provincial and municipal levels, we imported the overall 83 samples. **Table 2** showed the examples that we coded the 61 samples on provincial-level. As shown in **Table 2**, each of the 61 samples were coded in the format of "document number-frequency-specific category". The results of coding were further discussed in section 3.

Table 1. Analysis class definition.

Sort of categories	Code	Analysis category	Definition
Policy objectives	A	Improve administrative efficiency	The use of digital technology to reshape the operation process and model of administrative power, effectively break organizational barriers and information barriers, improve government governance capacity and public service quality, and effectively promote the efficient performance of government responsibilities, administrative quality, efficiency and government credibility (Zhang and Zhang, 2023).
	B	Increase transparency	Provide citizens with the means to know what actions are being taken, considered or reviewed by politicians and legislators; The ability of citizens to find and track the history of legislation and other deliberative matters, as well as to find the positions and votes of legislators and other government entities (Robertson and Vatrapu, 2010).
	C	Deepen the process of democracy	Citizens participate in all levels of government through information and communication tools, both if digital mechanisms are added to the "ordinary" democratic process, this cooperation can significantly strengthen and accelerate the democratic process in all areas of national life (Pyroha, 2022).

Table 1. (*Continued*).

Sort of categories	Code	Analysis category	Definition
	D	Improve public services	Digital government is a process of governing the information society space, providing quality government services and enhancing public service satisfaction through digital thinking, strategies, resources, tools and rules (Chohan et al., 2023; Li and Ding, 2020).
	E	Improve people's satisfaction	The deeper value of digital government lies in providing users with high-quality and convenient public services through digital concepts, digital thinking, digital rules, digital environment and digital resources, and enhancing users' sense of gain and satisfaction (Chen et al., 2023).
	F	Promote industrial transformation	Government digitalization is a key support for leveraging economic digitalization, improving total factor productivity, and accelerating the deep integration of digital economy and real economy such as Internet, big data and artificial intelligence (Wang et al., 2023).
Policy instruments	G	Infrastructure	Science and technology infrastructure, including the construction of computers and networks to enable "the integration of hardware, software, and skills that enable people to connect with each other and access a vast array of services and information resources through computers and the Internet" (Robertson and Vatrapu, 2010).
	H	Financial support	Through overall management of provincial and municipal government construction funds, the government actively strives for national and provincial special funds to strengthen the construction of "digital government" (Wang et al., 2023).
	I	Data governance	In the face of citizens' demand for digital use, government agencies need to manage information and data, including: access convenience, data integrity and accuracy, fast delivery, information security, etc. (Wang et al., 2023).
	J	Personnel training	The government strengthens the training of professional personnel, attaches importance to the training of business backbone, optimize the environment for personnel services and scientific and technological innovation, so as to strengthen the ability of information decision-making (Wang et al., 2023).
	K	Cooperation between government and enterprise	The government uses economic means of service outsourcing and government purchase to support the construction of digital government and provide services for digital government (Li and Ding, 2020)
	L	Increase market demand	Through product and service demand side subsidies, application promotion, technology promotion and other ways, the government improves consumers' purchasing ability and willingness to use, thus supporting the research and development and industrialization of emerging information technologies (Wang et al., 2023)
	M	Supervision and administration	The government conducted investigations on relevant service organizations and held irregularly working meetings to supervise and manage the work of the digital government construction team (Chung and Kim, 2019)
	N	Demonstration project	Establish various demonstration projects or pilot projects to promote the development of digital government (Cheng et al., 2023).
	O	Legal norm	The government formulates laws, regulations, policy documents and standards related to the construction of digital government to ensure the orderly opening and standardized operation of the construction of digital government (Chung and Kim, 2019).
	P	Safety guarantee	The government continues to improve network and information security, and strengthen government organization security and data security (He, 2022).
	Q	Mechanism innovation	By deepening the reform of the approval system, the government has actively and steadily promoted the reform of departmental information technology institutions, improved the project management mechanism, and established a regular work coordination mechanism. (Tolbert et al., 2008).

Table 2. Policy classification coding (examples of GD1-GD 4).

Number	Document number	Name of the policy text	Institutions for policy implementation	Date	Code number
1	GD1	Notice of the General Office of the Guangdong Provincial People's Government on the issuance of the Action Plan for Promoting the Construction of Smart City Clusters and Informatization in the Pearl River Delta Region (2014–2020)	General Office of the People's Government of Guangdong Province	2014	GD1-1a, GD1-5d, GD1-4f, GD1-7g, GD1-2i, GD1-1q
2	GD2	Notice of the General Office of the Guangdong Provincial People's Government on issuing the Cloud Computing Development Plan of Guangdong Province (2014–2020)	General Office of the People's Government of Guangdong Province	2014	GD2-8f, GD2-32g, GD2-3h, GD2-21i, GD2-7j, GD2-11k, GD2-18l, GD2-8n, GD2-2o, GD2-20p
3	GD3	Notice of the General Office of the Guangdong Provincial People's Government on issuing the "Internet Plus" Action Plan of Guangdong Province (2015–2020)	General Office of the People's Government of Guangdong Province	2015	GD3-5a, GD3-3b, GD3-37d, GD3-17f, GD3-17g, GD3-8h, GD3-15i, GD3-1j, GD3-53k, GD3-29l, GD3-3m, GD3-42n, GD3-2o, GD3-24p, GD3-6q
4	GD4	Notice of the General Office of the Guangdong Provincial People's Government on issuing the Guangdong Provincial Action Plan for Promoting Big Data Development (2016–2020)	General Office of the People's Government of Guangdong Province	2016	GD4-2a, GD4-2b, GD4-41d, GD4-2e, GD4-22f, GD4-66g, GD4-4h, GD4-5i, GD4-9j, GD4-19k, GD4-21l, GD4-2m, GD4-12n, GD4-3o, GD4-15q

3. Transitions of policy contents in the Greater Bay (2013–2023)

We took the years 2013 and 2019 as the two milestones to divide transitions of policy contents from 2013 to 2023 into two periods. 2013 was the year when the governments of Hong Kong, Macao and Guangdong on the provincial-level promoted the reform of digital governance in accordance with 12th Five-Year Plan for the Construction of National Government Informatization Project issued by the National Development and Reform Commission of the central government. 2019 was the year when the Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area was released by the State Council, and the vision for regional coordination towards the establishment of digital governance was formally revealed. In this section, we will compare the dynamic transitions of policy contents in the Greater Bay in different periods of time. As policies of Guangzhou and Shenzhen on the municipal-level were commanded to follow the guidance of Guangdong Province, we concentrated on the analysis on the provincial-level, i.e., policies promoted by the governments of Hong Kong, Macao and Guangdong.

3.1. Overview of the numbers, institutions and types of policy documents

The numbers of policy documents issued by the governments of Hong Kong, Macao and Guangdong were quite different from each other. As shown in **Table 3**, Hong Kong issued the least of policies with only 13 documents weighted as much as

21.31%; Guangdong Province on the other hand issued the highest number of policies with the number of 21 documents which occupied 34.43% of the overall documents. In terms of the time of policy issuances, the overall number of issuances in the second period (2019–2023) was higher than the first one (2013–2018). However, the three governments of Hong Kong, Macao and Guangdong Province showed the uneven changes over the two periods. Only the government of Hong Kong issued more policies in the first period than the second one. Compared with Hong Kong, both Macao and Guangdong increased the issuance of policies towards digital governance in the second period.

The three governments of Hong Kong, Macao and Guangdong also showed the diversity for the institutions issuing policy documents (as shown in **Table 4**). In Hong Kong, it was the executive branch especially Hong Kong Chief Executive to play the main roles to establish digital governance as part of smart cities. Hong Kong Innovation and Technology Bureau which twice participated in the release of the Hong Kong Smart City Blueprint was also active in the issuances of policies. Besides, Macau showed the wide distribution of institutions which issued the digital related policies. All the executive, legislative and judiciary branches were involved in the issuances of policy documents. Macau Government of Special Administrative Regions in executive branch was the main institution which issued 11 samples, and the Legislative Assembly of the Special Administrative Regions which legislated the Cybersecurity Law (Law no. 13/2019) and the E-Government Law (Law no. 2/2020) provided the legal foundations for the construction of digital governance in Macao. The judiciary branch such as Prosecutor's office of Macau Special Administrative Regions and Court of the Macau also issued E-Government Implementation Rules (Administrative Regulation no. 24/2020) as well as the Order of the President of the Court of Final Appeal (Law no. 2/GPTUI/2020) to guide the details for the implementation of digital governance policies. In addition, both executive and legislative branches in Guangdong Province were involved in the issuances of policy documents. The General Office of the People's Government of Guangdong Province was the main institution within the executive branch to issue policies, while the Guangdong Provincial People's Congress as the legislative branch provided legal foundations such as the Guangdong Digital Economy Promotion Regulations for the development of digital governance.

There were different levels of policies issued by the three governments of Hong Kong, Macao and Guangdong. In all three governments, "laws and regulations "at the highest level were the least, but "planning and decisions", "notices and comments", "measures and schemes "at the lower levels were concentrated. Hong Kong and Macao both focused on "planning and decisions "and "measures and schemes "(9 samples in each region), and Guangdong Province mainly focused on "planning and decisions "and "measures and schemes "(9 samples each) (as shown in **Table 5**). The emphases of "planning and decisions ", "notices and comments "and "measures and schemes "in the three governments reflected common concerns of them towards the operational details of policy implementation.

Table 3. The issuing stage and quantity of provincial digital government policies.

Time period	2013–2018	2019–2023	Total
Guangdong Province	10	11	21 (34.43%)
Hong Kong	8	5	13 (21.31%)
Macau	7	10	17 (27.87%)
Total	28 (45.91%)	33 (54.09%)	61 (100%)

Table 4. Issuing agencies of provincial digital government policies.

Province	Issuing agencies						Total
Guangdong Province	General Office of the People's Government of Guangdong Province (17)	People's Government of Guangdong Province (2)	Guangdong Provincial People's Congress (1)	Industry & Information Technology Commission of Guangdong Province (1)	\		21
Hong Kong	Hong Kong Chief Executive (10)	Commerce and Economic Development of Hong Kong (1)	Hong Kong Innovation and Technology Bureau (2)	Legislative Council of Hong Kong Special Administrative Region (SAR) (1)	\		14
Macao	Macau SAR Government (10)	Legislative Assembly of Macau SAR (2)	Macao Chief Executive (2)	The Prosecutor's office of Macau SAR (1)	Court of the Macau SAR (1)	Macau Science and Technology Commission (1)	17

Table 5. Policy type of provincial digital government policies.

Policy type	Laws and regulations	Planning and decisions	Notices and comments	Measures and schemes	Total
Guangdong Province	2 (8.69%)	9 (39.13%)	3 (13.04%)	9 (39.13%)	23 (100%)
Hong Kong	1 (7.14%)	2 (14.29%)	10 (71.43%)	1 (7.14%)	14 (100%)
Macao	3 (17.65%)	1 (5.88%)	10 (58.82%)	3 (17.65%)	17 (100%)

3.2. Comparisons of policy objectives and instruments

The three regions of Hong Kong, Macao and Guangdong have used different policy instruments to achieve divergent objectives through the promotion of digital governance. As the transitions of policy contents showed diverse dynamics in different periods of time, in this section, we would first review the policy changes in the first period and afterwards the transitions in the second one. The effects of policies of digital governance in Guangdong especially the achievements in the second period of time was shown in the Appendix.

3.2.1. First period (2013–2018)

The main policy objectives of all the three governments of Hong Kong, Macao and Guangdong in the first period were improve public services and improve

administrative efficiency. As shown in **Table 6**, these two policy objectives accounted for the highest percentage, i.e., 20.65% in Hong Kong, 15.98% in Macao and 17.86% in Guangdong Province. However, the interpretation and focus of improve public services differed among these governments. Hong Kong focused on digital services in the sectors of tourism, transportation, and healthcare; and Macao tended to establish a united platform for providing information and services to both external and domestic public. Guangdong strengthened the roles of street-levels civil servants to provide public services, as well as the establishment of online platform for one-stop service. For example, in the second edition of Hong Kong's Hong Kong Smart City Blueprint, it was mentioned that "the objective of the new edition was to enable the public to better experience the benefits of smart cities and innovative technologies in their daily lives", such as optimization of the smart tourism platform and so on. Guangdong Province issued the policy document of "Guangdong Province "digital government" reform and construction guidelines of 2019 "which announced that "with the purposes to satisfy the public, enterprises and government staffs, the government would upload data to clouds and downward the services to the street-level civil servants in order increase digital applications through governance systems." Yet, it was worth of notice that besides the objectives of improve public services and improve administrative efficiency, the priority of other policy objectives of the three governments were not entirely consistent. Both Hong Kong and Guangdong Province considered promote industrial transformation as prior policy objective (Hong Kong 8.56%, Guangdong 6.34%) and tended to stimulate the development of the regional digital economy through the development of digital governance. Macao however emphasized Increase Transparency and aimed to enhance the internal management of the government.

The three governments possessed different preferences for policy instruments. Hong Kong and Macau consistently prioritized infrastructure, with the highest frequency of 12.59% in Hong Kong and 20.71% in Macau. Besides, Hong Kong had a more pronounced tendency to use the instruments of personnel training and financial support. As Hong Kong focused on the policy objectives of improve public services, improve administrative efficiency and promote industrial transformation, the government of Hong Kong especially encouraged the recruitments of talents to involve in the innovation and industrial development of digital economy. For instance, the second edition of the Hong Kong Smart City Blueprint announced to "attract and retain more innovation professionals, especially in the areas of biotechnology, data science, artificial intelligence, cyborgs and cybersecurity". Macao however had a higher frequency of using the policy instrument of Demonstration Project which established pilot projects to develop e-government in order to fulfill the objectives of improve public services and improve administrative efficiency. Guangdong Province used data governance (16.06%) as the important policy instrument and emphasized the construction of data centers of e-government as well as the integration and use of data resources. Moreover, infrastructure and mechanism innovation were also prioritized by Guangdong Province in the first period of time to achieve the policy objectives of improve public services and improve administrative efficiency.

Table 6. Coding and frequency of categories of provincial digital government policy objectives and tools.

Number	Sort of .	Analysis category	Guangdong province				Hong Kong				Macao			
			2013–2018		2019–2023		2013–2018		2019–2023		2013–2018		2019–2023	
			Frequency	Proportion	Frequency	Proportion	Frequency	Proportion	Frequency	Proportion	Frequency	Proportion	Frequency	Proportion
A	Policy Objectives	Improve administrative efficiency	89	5.18%	25	1.69%	20	5.04%	9	5.56%	17	10.06%	11	8.40%
B		Increase transparency	64	3.72%	18	1.22%	13	3.27%	4	2.47%	13	7.69%	1	0.76%
C		Deepen the process of democracy	26	1.51%	0	0.00%	5	1.26%	2	1.23%	1	0.59%	0	0.00%
D		Improve public services	307	17.86%	260	17.60%	82	20.65%	40	24.69%	27	15.98%	12	9.16%
E		Improve people's satisfaction	17	0.99%	12	0.81%	6	1.51%	2	1.23%	4	2.37%	3	2.29%
F		Promote industrial transformation	109	6.34%	59	3.99%	34	8.56%	14	8.64%	2	1.18%	0	0.00%
G		infrastructure	141	8.20%	240	16.25%	50	12.59%	17	10.49%	35	20.71%	36	27.48%
H		Financial support	28	1.63%	22	1.49%	38	9.57%	22	13.58%	1	0.59%	0	0.00%
I		Data governance	276	16.06%	191	12.93%	15	3.78%	7	4.32%	10	5.92%	16	12.21%
J		Personnel training	35	2.04%	25	1.69%	37	9.32%	14	8.64%	3	1.78%	0	0.00%
K		Cooperation between government and enterprise	57	3.32%	132	8.94%	22	5.54%	6	3.70%	7	4.14%	0	0.00%
L		Increase market demand	90	5.24%	117	7.92%	20	5.04%	9	5.56%	6	3.55%	2	1.53%
M		Supervision and administration	29	1.69%	53	3.59%	6	1.51%	3	1.85%	1	0.59%	0	0.00%
N	Policy Instruments	Demonstration project	33	1.92%	70	4.74%	2	0.50%	1	0.62%	15	8.88%	0	0.00%
O		Legal norm	130	7.56%	75	5.08%	29	7.30%	6	3.70%	12	7.10%	33	25.19%
P		Safety guarantee	132	7.68%	82	5.55%	12	3.02%	4	2.47%	11	6.51%	10	7.63%
Q		Mechanism innovation	156	9.08%	96	6.50%	6	1.51%	2	1.23%	4	2.37%	7	5.34%
Total			1719	100%	1477	100%	397	100%	162	100%	169	100%	131	100%

3.2.2. Second period (2019–2023)

The three governments of Hong Kong, Macao and Guangdong showed the different extent of continuity in policy objectives towards the development of digital governance in the second period. Improve Public Services remained as the most important policy objective of the three governments (Guangdong 17.60%, Hong Kong 15.98% and Macao 9.16%) (**Table 6**). Yet, besides the policy objective of the first priority, it was Hong Kong which showed the highest continuity for other secondary objectives. Hong Kong still prioritized the objectives of improve administrative efficiency and promote industrial transformation in the second period which were

totally the same as the first period of time. Moreover, both Macao and Guangdong Province also possessed strong continuity with merely slight changes in their own policy objectives. Macao continued prioritizing Improve Administrative Efficiency but no longer emphasized Increase Transparency, and Guangdong Province remained the priority of Promote Industrial Transformation but ignored Improve Administrative Efficiency. In other words, each of the three governments showed strong path dependencies for the selection of policy objectives. Hong Kong even maintained totally the same objectives as the first period.

All the three governments of Hong Kong, Macao and Guangdong remained Infrastructures as the most important policy instrument. As shown in **Table 6**, these three governments all prioritized the utility of infrastructure (Hong Kong 10.49%, Macau 25.19%, and Guangdong 16.25%). Besides infrastructure, Hong Kong still focused on the two instruments of Personnel training and financial support; Macao has slightly changed the instruments by strengthening legal norm and reducing the frequency of demonstration project to achieve the policy objective of improve administrative efficiency. It was Guangdong which showed relatively greater transitions in policy instruments. In addition to infrastructure, Guangdong continued using data governance as the primary policy instrument and simultaneously increased cooperation between government and enterprise and increase market demand to facilitate the achievement of the objective of promote industrial transformation. Compared with the first period, Hong Kong remained totally the same instruments, and Macao and Guangdong also showed strong path dependencies for the implementation of policy instruments.

4. Transitions of policy networks of digital governance in the Greater Bay Area

This section analyzed transitions of policy networks in the Greater Bay Area from 2013 to 2023. Based on the institutions which issued the policy documents, we portrayed the networks of governance among Hong Kong, Macao and Guangdong in the two periods of time (as shown in **Figures 1** and **2**). As we assumed that policy networks could exist in national, provincial and municipal levels, we included policy documents issued by the State Council and the National Development and Reform Commission (such as Guiding Opinions of the State Council on Deepening Pan-PRD Regional Cooperation, 2016; Framework Agreement on Deepening Guangdong-Hong Kong-Macao Cooperation in the Development of the Greater Bay Area, 2017), as well as the municipal governments of Guangzhou and Shenzhen in order to observe the multi-level networks of digital governance in the Greater Bay.

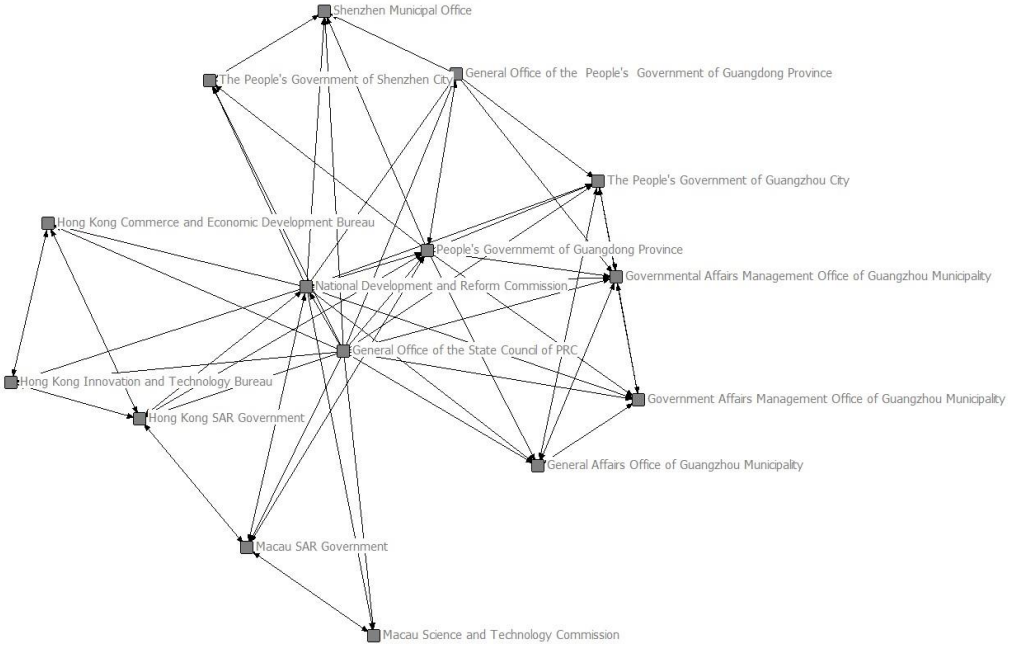

Figure 1. The first phase digital government policy main body network.

The executive branch of the three governments of Hong Kong, Macao and Guangdong, and their subordinate departments were the main institutions that promoted policies regarding to the digital governance in the Greater Bay Area in the first period. As shown in **Figure 1**, in Hong Kong the government of Special Administrative Regions of Hong Kong was the main institution which issued the majority of policies, and the Commerce and Economic Development Bureau as well as the Innovation and Technology Bureau were the most essential subordinate departments which implemented policies of digital governance such as the Hong Kong Smart City Blueprint outlining the initial vision of Hong Kong's Smart City. In the networks of Macau, the Government of Special Administrative Regions of Macao and the Science and Technology Commission were the most important institutions involved in the promotion of digital governance. And in Guangdong Province Guangdong People's Government of Guangdong Province was in the center of the policy networks which clearly guided the People's Government of Guangzhou City and People's Government of Shenzhen City to launch the policies of digital governance. However, just as shown in **Figure 1** the three governments of Hong Kong, Macao and Guangdong had limited connections with each other but promoted policies of each own. At this stage, under the auspices of the National Development and Reform Commission, the People's Government of Guangdong Province, the Government of the Hong Kong SAR and the Government of the Macao SAR worked together to discuss the framework agreement on deepening Guangdong-Hong Kong-Macao cooperation.

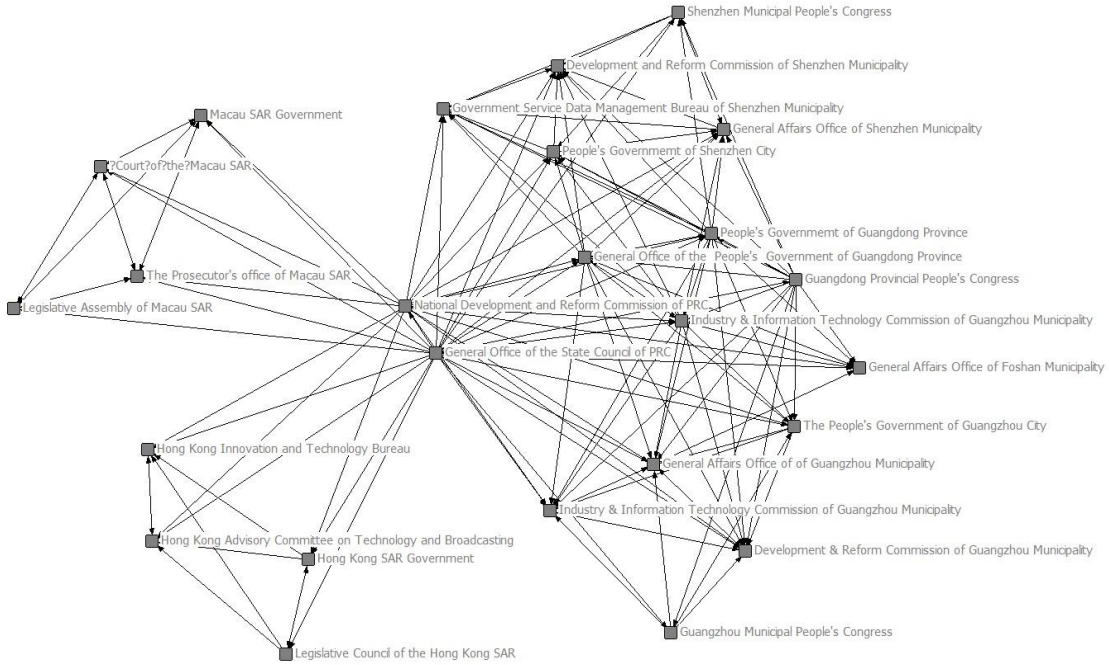

Figure 2. The second phase digital government policy main body network.

The policy networks in the Greater Bay became more complex in the second period of time (as shown in **Figure 2**). More departments were involved in the networks of governance alongside the promotion of the outline development plan for the Guangdong-Hong Kong-Macao Greater Bay Area in 2019. In Hong Kong, while the Government of Special Administrative Regions of Hong Kong was still the main institution to issue the majority of policies, the Legislative Council also involved in the networks and jointly issued the policy with the Hong Kong Committee on Technology and Broadcasting for once. In Macau, all the executive, legislative and judiciary branches participated in the policy networks. For example, the Legislative Assembly of Macau has once issued a policy with Macao Chief Executive. Moreover, in Guangdong the policy networks became much more complex compared with the first period. Not only Guangdong People's Government of Guangdong Province of the executive branch was deeply involved in the policy networks, but Guangdong Provincial People's Congress of the legislative branch has also issued four policy documents which covered various aspects of digital governance including digital economy, information sharing and data governance. On the municipal level, People's Government of Guangzhou City and People's Government of Shenzhen City as the executive branches on the municipal level were still the main institution to issue policy documents, and at the same time Guangzhou Municipal People's Congress and Shenzhen Municipal People's Congress as the executive branches on the municipal level also got involved in the digital governance of each city. However, as shown in **Figure 2** even the Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area was launched in 2019 to guide regional coordination, the horizontal policy networks across the three provincial-level governments of Hong Kong, Macao and Guangdong were still limited. The increasing complexity of policy networks was embedded in each of three provincial-level government as well as the vertical networks between Guangdong Province and cities of Guangzhou and Shenzhen.

Neither the horizontal networks among the three provincial-level governments nor networks on the municipal-level across the cities of Guangzhou and Shenzhen and Hong Kong and Macao have been thoroughly developed.

5. Discussions

This article systematically reviewed the policy transitions of digital governance in China with a focus on the experiences of the Greater Bay in the last decade. Through the method of content analysis, we surveyed the evolution of policy contents and summarized the dynamic changes of policy networks in the transitional processes in the Greater Bay. Based on our results, we generated two insights into the policy transitions in the Greater Bay as well as two policy implications for the future development in the area and other countries which tended to develop digital governance and related infrastructures.

The three governments of Hong Kong, Macao and Guangdong possessed divergent policy contents including both policy objectives and instruments which did not necessarily change with the top-down policy guidance of regional integration. As discussed in section 4.3, Hong Kong prioritized the policy objectives of improve public services, improve administrative efficiency, and promote industrial transformation and consistently used the policy instruments of infrastructure, personnel training and financial support to achieve the objectives over the two periods. Macao and Guangdong merely possessed slight differences in their policy objectives and instruments in the two periods of time. Macao has emphasized the objectives of improve public services and improve administrative efficiency in both of the two periods and remained Infrastructure as the most important instrument. Only the objective of Increase Transparency which was prioritized by the government of Macao in the first period was ignored in the second period, and the instrument of demonstration project which was emphasized in the first period was replaced by Legal Norm. In the experiences of Guangdong, improve public services and promote industrial transformation remained in the top priority of policy objectives, and infrastructure and data governance were the main policy instruments in the two periods of time. Besides the objective of Improve Administrative Efficiency which was emphasized by Guangdong government in the first but ignored in the second period, the instrument of mechanism innovation which was extensively used in the first period was replaced by the instruments of cooperation between government and enterprise as well as increase market demand. In other words, the regional coordination provided by the outline development plan for the Guangdong-Hong Kong-Macao Greater Bay Area of the central government did not switch the strong path dependencies of the three governments on the provincial-level to promote their own versions of digital governance. Even the three governments of Hong Kong, Macao and Guangdong showed the consistencies in the policy contents such as the objective of Improve Public Services and the instrument of Infrastructure, the three governments did not push forwards the establishment of common regional infrastructures towards digital governance which could facilitate the common objective of improve public services in the overall Greater Bay.

The policy networks of the three provincial-level governments also showed the

weak connections among each other. As analyzed in section 4, the executive branches in the governments of Hong Kong, Macao and Guangdong have continuously been the main institutions to implement policies of digital governance in the two periods of time. The legislative branches of the three governments only participated in the policy networks since the second period, and judiciary branch of Macao also emerged in the policy networks in the second period of time. As we have mentioned in section 4, although the institutions involved within policy networks increased through the first and second periods, the additional institutions were the existing ones originally embedded in provincial or municipal governments, rather than the new institutions which were established across the three governments of Hong Kong, Macao and Guangdong. As displayed in **Figures 1** and **2**, the three governments of Hong Kong, Macao and Guangdong have separately followed the guidance of the central government without clear governance frameworks for formal policy coordination. Until 2023, the coordination across the three governments was still limited. Besides following the guidance of the central government, the governments of Hong Kong, Macao and Guangdong did not establish formal institutions which were able to officially issue policy documents implemented in the overall region of the Greater Bay.

On the basis of our empirical analysis, we found that merely the vertical guidance from the central government did not necessarily generate regional coordination. There were two policy implications which may advance the coordination between governments of the same region. First, different governments could start policy coordination from shared policy objectives and cooperate to implement joint policy instruments in order to achieve the shared objectives. In the case of Guangdong, Hong Kong and Macao Greater Bay, as improve public services and infrastructure have consistently been the policy objective and instrument shared by the three governments, these three governments could promote the digital infrastructures in each own domain to be compatible with each other thus to facilitate the provision of synergic public services. Second, governments of the same region could establish innovative governance frameworks which forwarded the consensus of policy objectives and instruments among different governments and at the same time involved different stakeholders in the policy networks. The organization of committees which were consisted of representatives from different governments and jointly issued common policy documents of the whole region may be one of the alternative institutions effectively strengthening policy coordination in regional governance.

This article also possessed two limitations which should be further explored by future research. First of all, we adopted the sole method of content analysis. More comprehensive methods, such as quantitative surveys, may be adopted to explore the incentives of governments at different levels to fulfill digital governance through regional coordination. Moreover, we only analyzed one case of the Greater Bay in China, future research may expand the multiple case studies in other regions of other countries and generate deeper understanding towards the establishments of institutions which influenced policy coordination in regional governance.

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Appendix

This section provided a short review towards the effects of the policies of digital governance in Guangdong especially the achievements in the second period of time (2019–2023). As we have mentioned in section 3.2.2, the main policy objectives in Guangdong Province in the second period were improve public services and promote industrial transformation. The effectiveness of the two policy objectives was shown in **Table A1** below.

Table A1. The effectiveness of the main policy objectives in Guangdong Province in the second period.

Policy objectives	**Effectiveness**
Improve public services	1) Developing a standard system for all government halls across the province, and promoting the one stop service. 2) Building an online and offline evaluation system and delivering 3644 kinds of public services through on-line systems. 3) Reducing the application procedures of telegraphic installation services and remaining only 15 % of the original compulsory application forms.
Promote industrial transformation	1) One-stop services for business start-ups to simultaneously log in to the systems of six subordinate departments of Guangdong Province. 2) Launching the APP of "Yue Shang Tong" providing mobile government service to more than 6 million business entities.

Source: The Research Report on Digital Government Development in China (2021).