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Research on Some Phenomenon of E-Government Service Capacity Distribution in Mainland China Based on Multi-channel Perspective

Completed Research Paper

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Abstract

In the context of the government's increasing emphasis on e-government services, this is an urgent need for empirical research of large sample and multi-channels. Therefore, based on the government website, WeChat, Micro-blog, app, by using the existing mature evaluation index system, this paper analyzes e-government service capacity of the city above prefecture-level and provincial. Then, this paper selects the administrative level, economic level, regional balance as the differentiation attribute. It is found that both administrative level and economic level are positively correlated with government service capacity in all the channels. The channel capacity distribution varies related to attribute of administrative and economic, government type of city and province, but it is not restricted by level and region. It provides direction and intensity management to balance and promote channel service capacity for China government.

Keywords: E-government services, service capacity distribution, social media channels

Introduction

E-government service capacity can be defined as a combination of procedures, methodologies and resources formed by government organizations to complete the goal of providing electronic services (Hu et al. 2014). Its empirical research is helpful to the development of e-government service, but there are few related researches. On the one hand, the research on differentiation is insufficient, so it is

difficult to show the more development characteristics of e-government service. On the other hand, the analysis based on multi-channels perspective is insufficient. Because the existing empirical research mainly based on the website. With the popularization of new social media in government service, e-government service of website cannot fully represent the whole e-government service.

This paper takes China as an example. Based on the website, Microblog, WeChat, app as a multi-social medias perspective, with administrative level, economic level, regional balance as the differentiation characteristics, using 2016 e-government service capacity score as the data source published by government data resources institute of Nanjing University, Xinhua.net, and so on (Hu et al. 2017), the paper analyzes the differentiation law of e-government service capacity in provinces and cities to make up the deficiency of the existing research.

Literature Review

The mainly research of e-government service started in 2001 (Chen et al. 2001), and the e-government service evaluation research has attracted more and more attention mainly since 200(Li. 2006). At present, the e-government assessment is mainly carried out by institutions, university and consulting firms (Ding et al. 2017), providing data support for the research. Some scholars have studied the evaluation of e-government service from the theoretical perspective, such as Ibrahim, Hilles and Adam, etc., which have studied the methodology and theoretical framework of e-government service evaluation (Ibrahim et al. 2016). Some other scholars have studied the empirical evaluation. On the one hand, the research of maturity evaluation gained attention. For example, Osta has evaluated the maturity of e-government service (Ostašius. 2017). On the other hand, service quality evaluation is in the ascendant. For example, Albalushi, Ali evaluate e-government service quality from the perspective of quality trend analysis (Albalushi et al. 2015) and Anwer, Esichaikul, Rehman evaluate e-government service quality from the perspective of citizen satisfaction (Anwer et al. 2016). In recent years, mobile government services have been concerned. For example, Almarashdeh, Alsmadi research mobile government services evaluation from the expert perspective (Almarashdeh et al. 2017). Therefore, the differentiation research is relatively few. The differentiation research of government service is mainly reflected in the research on the difference between government service and private service and between local governments in different regions. For example, Ansell studied the differences between government service and private practice (Ansell. 1988), and Sun studied the regional differences of public service performance (Sun. 2016). However, the research on the difference of e-government service is scarcer, which mainly focuses on individual differences. For example, Susanto, Goodwin studied the differences between users and non-adopters of SMS based e-government services (Susanto et al. 2013).

However, the research on the difference between different channels and different administrative levels and economic levels and regionals development are lacking, which has interesting meaning. When these problems are studied, e-government service capacity can be improved by further advice. The development of e-government service in China has been highly valued by the government, so the new media channels are abundant. In addition, China is a vast country with many different levels of government unit, so its economic development and regional development are unbalanced. Therefore, the choice of mainland China will make the study more representative.

Index System Selection

Indicator System

E-government service capacity is a comprehensive capacity based on the weighting of several e-government service dimensions. The construction of the existing e-government service capacity evaluation system basic based on the external view of government (Hu et al. 2008; Yang. 2013), so it fails to embody the internal effect of e-government service. Therefore, this paper mainly adopts the theory of resource capacity, organization capacity and organization practice to construct index system from the perspective of internal government, which is based on the research of professor Hu (Hu et al. 2012; Pan et al. 2016). First layer dimensions are information service capacity, transaction service

capacity, participation service capacity, service delivery capacity and service innovation capacity (Hu, 2010; Hu et al. 2012; Pan et al. 2016). Considered with the features of new social media, such as WeChat, Microblog, the influence dimension was added (Hu et al. 2017). After the expert discussion and the empirical evaluation, the corresponding measurement indexes are set according to different channels (Hu et al. 2017). Finally, based on four channels, the e-government service capacity is calculated as shown in formula (1). Table 1, 2, 3 and 4 show the evaluation index system of each channel. The detailed description is as follows.

Table 1. Evaluation Index of Website Service Capacity

First Order Dimension	Secondary Indicator	Interpretation of Secondary Indicator
Information Service Capacity	Useful and practical	Query the usefulness of specifying information
	Source of authority	Statistics on the authoritative source of information issued by the government
	Validity of time	Real-time features of information release
	Easy available.	Validity of statistical link
Transaction Service Capacity	Public transaction	Electronic service capability for the whole process of public transaction
	Business transaction	Electronic service capability for the whole process of business transaction
	Ratio of the whole process.	Ratio of items which can be electronic-serviced in the whole process
Participation Service Capacity	Participate management	Ability to participate in management through government electronic channels
	Participation response	Timeliness of electronic channel response
	Participation feedback	Validity of feedback content
Service Delivery Capacity	Convenience and ease using	Convenient design ability of channels
	Fair	Ability to support the fair use of different groups
	Stable and reliable	Ability of a web page to display properly
Service Innovation Capacity	Absorption capacity	Effectiveness of government channel feedback
	Ability to share and spread	Ability to share information on social platforms

Table 2. Evaluation Index of APP Service capacity

First Order Dimension	Secondary indicator	Interpretation of Secondary Indicator
Information Service Capacity	Useful and practical	Query the usefulness of specifying information
	Source of authority	Statistics on the authoritative source of information issued by the government
	Validity of time	Real-time features of information release
	Easy and available.	Validity of statistical link

Transaction Service Capacity	Efficiency and Effectiveness	Transaction service capacity of citizens and enterprises
Participation Service Capacity	Participate management	Ability to participate in management through government electronic channels
	Participation response	Timeliness of electronic channel response
	Participation feedback	Validity of feedback content
Service Delivery Capacity	Channel	Richness degree of access types (Android and iOS)
	Cover	Richness degree of the service type
	Availability	Channel acquisition mode (richness degree of software vendors)
	Stable and reliable	Ability of web pages to display properly
	Easy to use	Ability of convenient design
	Used feedback	Feedback of channel usage
	Social communication	Ability to share information on social platforms

Table3. Evaluation Index of WeChat Service Capacity

First Order Dimension	Secondary Indicator	Interpretation of Secondary Indicator
Information Service Capacity	Useful and practical	Query information usefulness
	Source of authority	Statistics on the authoritative source of information issued by the government
	Validity of time	Real-time features of information release
	Easy available.	Validity of statistical link
Transaction Service Capacity	Efficiency and Effectiveness	Transaction service capacity of citizens and enterprises
Participation Service Capacity	Participate forms	Count the number of participating service forms
WeChat Influence	User scale	User focus (thumb up number and reading number)
	Information scale	Quantity of information released
Service Delivery Capacity	Convenience and ease using	Ability of convenient design

Table 4. Evaluation Index of Microblog Service Capacity

First Order Dimension	Secondary Indicator	Interpretation of Secondary Indicator
Information Service Capacity	Useful and practical	Amount of useful information
	Source of Authority	Statistics on the authoritative source of information issued by the government
	Validity of time	Real-time features of information release
	Easy available.	Validity of statistical link
Microblog Influence	User scale	User attention scale
	Information scale	Scale of average daily Microblog information
	Active	Original rate of Microblog information
	Interactive	Thumb up number, forwarding number and comment number in Microblog information
Service Delivery Capacity	Length of the release time.	Existence time of Microblog channel
Service Innovation Capacity	Adopt ability	Supports images, video, music, links and other elements
	Absorptive capacity	Ability to promote new features

$$EGSAI_C = \sum_{i=1}^4 \sigma_i EGSCI_i \quad (1)$$

Notes: $EGSAI_C$ is the comprehensive capacity of government electronic service in four service channels. σ_i refers to the weight. $EGSCI_i$ is the government electronic service capacity of the each channel. $i=1, 2, 3$ or 4 , which represents the website, Microblog, WeChat, app.

(1) Information service. Information service capacity is the basic content of e-government services, refers to the government release public information to the public and enterprises through the electronic government service platform, so as to promote administrative openness, transparency and data resources sharing (Hu et al. 2008).

(2) Transaction services. Transaction service capacity can assist enterprises and public to handle various specific affairs. It represents the complex service content of IT application and service coordination, but it can effectively improve the efficiency of enterprise and public affairs service (Hu et al. 2008).

(3) Participate Service. Participating service capacity has a great demanding of network security, system interaction capacity, system management function in the application of e-government services. It aims to provide services for corporate and public participation in policy formulation to improve the quality and acceptable degree of policy and decision-making (Relly et al. 2009).

(4) Service delivery. Service delivery capacity is the characteristic of e-government service delivery and the process measurement of providing satisfactory service (Pan et al. 2016).

(5) Service innovation. Service innovation refers to the rapid response capacity of organizations on ever-changing user needs and social environment (Pan et al. 2016).

(6) Influence capacity. Influence capacity refers to the comprehensive affect capacity of new social media, which affects user acceptance and helps to exert advantages of new social media.

Index Weight

The weights are set by expert scoring method. First, the experts are invited to score in this field according to the nature of the indicators. Secondly, the reasonable weight distribution is obtained by judging matrix. Finally, Weights are added to the index system (Hu et al. 2017).

Data Collection and Processing

Based on the principles of objectivity, impartiality, quantification and repetition, the government service channel of website, Microblog (Sina Microblog), WeChat and app (client of mobile phone) of 31 provinces, 4 municipalities and 334 cities in prefecture-level were used as the test object. After data review and standardization, the final competency score was obtained (Hu et al. 2017).

Differentiation

Differentiation research is common in geographical studies, and this paper applies it to the field of e-government service, which is expressed as follows. Considering the important role of the administrative level, economic level and regional development, this paper regards these as the differentiation basis.

Differentiation Attributes

(1) Administrative level. The level of government administrative means the amount of political capital, which can influence the redistribution of resources (Zeng et al. 2017). Therefore, the power of government in administrative management and social economic management is strictly corresponding to the administrative level (Liu. 2012). The higher the city administrative level, the more the public service resources centralized, which leads to the difference of public service capacity (Tan et al. 2016). However, the influence of different government administrative levels on the distribution of e-government service capacity is not detailed exploration. Therefore, the paper selects the administrative level as the important external influence factor. According to the above literature and China's conditions, the administrative levels of local governments are divided into province government, city in province-level, city in sub-province-level and ordinary city in prefecture-level.

(2) Economic level. Economic development is an important material basis for regional growth, which also determines the investment of e-government service projects to a large extent. Therefore, the basic public service capacity has a significant positive correlation with regional economic development (Ten et al. 2012). Regional economic growth has also promoted the basic public service capacity to a certain extent (Jiang et al. 2014). However, there is a lack of detailed exploration of e-government service capacity in different economic levels. Therefore, the paper selects the economic level as the key internal factors. GDP is the representative index of economy, and the research sample is divided into three levels as high group, middle group and low group according to GDP.

(3) Regional development. Not only regional progress can promote social development, but also regional balance will have an important impact on social stability, including social cohesion and centripetal force. Therefore, the paper chooses regional development as an important social factor. China's geographical regions can be divided into east, central, south, north, southwest, northwest and northeast.

Differentiation Analysis

Administrative Levels

(1) Capacity distribution. Based on the administrative level, the ranking of e-government service comprehensive capacity from high to low is city in province-level, city in sub-provincial-level, city in prefecture-level. This shows that the rank distribution in administrative levels is consistent with the website, WeChat, and Microblog, which means the distribution is basically uninfluenced by service channels. From the perspective of service channel, the distribution of e-government service capacity varies in different channels related to administrative levels. But Microblog and website are significantly ahead, which is not limited by the administrative level of city. In addition, the service capacity of

provincial governments is generally lower than that of city in province-level, but higher than that of ordinary cities. These are shown in table 5.

(2) Balanced distribution. The variance in table 5 shows these as follows. E-government service capabilities of different channels have different performances, which is related to the administration grades of city. The sub-provincial cities was the least obvious in difference degree and the ordinary city was the most obvious one. The differenced degree varies in different administrative grades, which is related to social channels. The difference ranking from low to high is the website, WeChat, Microblog, app, and the website is significantly balanced.

Table 5 .E-government Service Capacity Based on Administrative Grade Differentiation

	Website	Microblog	WeChat	App	Compre- hensive	Variance	Distribution Channels
M	63	76	58	45	59	123	B/S/C/A
P	56	67	40	24	45	265	B/S/C/A
S	55	62	42	47	51	58	B/S/A/C
O	53	45	31	20	38	161	S/B/C/A
Administrative Distribution	M/S/O	M/S/O	M/S/O	M/S/O	M/S/O		
Variance	14	127	95	147			

Notes: S, B, C, A are on behalf of the website, Microblog, WeChat, app. Z, S and P respectively represent the municipality in provincial-level, cities in sub-provincial-level and cities in ordinary prefecture-level.

Perspective of Economic Grade in City

(1) Capacity distribution. In terms of economic grade, the ranking of e-service capacity from high to low is high group, middle group and low group. All social channels are consistent with the distribution, which indicates that channels have no significant influence on the capacity distribution. In terms of service channels, the ranking of e-service capacity from high to low is the website, Microblog, WeChat and app, which is not restricted by economic grade, indicating that economic differentiation has no significant influence on capacity distribution of varies channels. These are shown in table 6.

(2) Balanced distribution. The variance of table 6 shows these as follows. The comprehensive service capacity of different channels have different performances, which is related to the economic grade. This difference ranking from low to high is website, WeChat, app, and Microblog. It should be noted that the website and WeChat have the significant balance. The service capacity in city of different economic grades have different performances, which is related to different service channels. The comprehensive ranking of difference degree from low to high is high group, low group and middle group.

Table 6. E-government Service Capacity of City Based on Economic Differentiation

	Website	Microblog	WeChat	App	Compre- hensive	Variance	Distribution Channels
High group	58	57	37	31	46	143	S/B/C/A
Middle group	54	45	33	18	39	182	S/B/C/A
Low group	52	41	31	16	36	176	S/B/C/A
Variance	6	46	6	44			
Economic Distribution	H/M/L	H/M/L	H/M/L	H/M/L	H/M/L		

Notes: H, M, L are on behalf of the high grade, middle grade, low grade.

Perspective of Economic Grade in Province

(1) Capacity distribution. In terms of economic grade, the comprehensive ranking of service capacity from high to low is high group, low group and middle group, which also conforms to the website and WeChat channel. In terms of administrative channels, the ranking of service capacity from high to low is Microblog, website, WeChat, app, which is not restricted by economic grade. It indicates that economic differentiation has no significant influence on channel distribution. These are shown in table 7.

(2) Balanced distribution. The variance in table 7 shows these as follows. The e-service capacity of different channels have different performances, which is related to the economic grade in province. The difference degree from low to high is website, Microblog, WeChat, app. The service capacity of province in different economic grades have different performances, which is related to different service channels. The ranking of difference degree from low to high is high group, low group, and middle group.

Table 7. E-Government Service Capacity of Provinces Based on Economic Grades

	Website	Microblog	WeChat	App	Compre-hensive	Variance	Channels Distribution
High group	59	70	49	35	52	166	B/S/C/A
Middle group	54	61	41	11	41	367	B/S/C/A
Low group	54	69	30	25	43	320	B/S/C/A
Variance	6	16	61	97			
Economic Distribution	H/M/L	H/L/M	H/M/L	H/L/M	H/L/M		

Regional Perspective in City

(1) Capacity distribution. As far as the region is concerned, the ranking of e-government service capacity from high to low is east China, south China, southwest China, central China, north China, northwest China and northeast China. The regional ranking distribution of e-government service capacity has different performance in different channels, but east China and south China are all significantly ahead. In terms of channel, the ranking of e-government service capacity from high to low is website, Microblog, WeChat, app, consistent with areas except east China, which suggest that the e-government service capacity of region has no significant impact on the channels performance. These are shown in table 8.

Table 8. E-government Service Capacity Based on Regional Differentiation in City

	NC	NE	EC	SC	CC	SW	NW	V	Regional Distribution
Website	51	44	58	60	57	51	48	29	SC/EC/CC/NC/SW/NW/NE
Microblog	44	28	60	47	41	44	42	76	EC/SC/NC/SW/NW/CC/NE
WeChat	34	26	39	34	30	29	26	20	EC/NC/SC/CC/SW/NW/NE
App	14	16	32	23	14	29	10	60	EC/SW/SC/NE/NC/CC/NW
Comprehensive	36	30	47	43	37	39	32		EC/SC/SW/CC/NC/NW/NE
Variance	194	101	145	193	246	92	219		
Channel Distribution	S/B/ C/A	S/B/ C/A	B/S/ C/A	S/B/ C/A	S/B/ C/A	S/B/ C/A	S/B/ C/A		

Notes: NC, NE, EC, SC, CC, SC, NW, V are on behalf of north China, northeast China, east China, south China, central China, southwest China, northwest China, variance.

(2) Balanced distribution. Table 8 shows these as follows. E-government service capabilities of different channels have different performances, which is related to the different regions. The basic ranking of difference degree from high to low is approximate southwest China, northeast China, east China, south China, north China, northwest China, central China. E-government service capabilities of different regions have different performances, which is related to the different channels. The ranking of difference degree from high to low is WeChat, website, app, Microblog.

Regional Perspective in Province

(1) Capacity distribution. As far as the region is concerned, the comprehensive ranking distribution of e-government services is central China, east China, north China, northwest China, southwest China, south China and northeast China. Distribution of regional ranking have different performances in different channels. In terms of channels, the e-government service comprehensive capacity from high to low is Microblog, website, WeChat, app. Although the distribution of different regions is slightly different, it indicates that the region has no significant influence on channel performance. These are shown in table 9.

(2) Balanced distribution. Table 9 shows these as follows. E-government service capabilities of different channels have different performances, which is related to the different regions. The ranking of difference degree from low to high is central China, south China, northwest China, southwest China, east China, north China and northeast China. E-government service capabilities of different regions have different performances, which is related to the different channels. The channel ranking of difference degree from low to high is the website, Microblog, WeChat, app. It's important to note difference degree of the website is significantly balanced.

Table 9. E-government Service Capacity in Provinces Based on Regional Differentiation

	N	NE	E	S	C	SW	NW	V	Regional Distribution
Website	57	47	63	57	54	56	56	19	EC/NC/SC/SW/NW/CC/NE
Microblog	74	58	67	49	66	62	63	52	NC/EC/CC/NW/SW/NE/SC
WeChat	28	47	47	33	53	39	42	65	CC/EC/NE/NW/SW/SC/NC
App	39	0	25	24	37	22	25	139	NC/CC/EC/NW/SC/SW/NE
Comprehensive	48	36	50	42	51	44	46		CC/EC/NC/NW/SW/SC/NE
Variance	307	502	273	168	106	244	211		
Distribution (channels)	B/S /A /C	B/S /A /C	B/S /C /A	S/B /C /A	B/S /C /A	B/S /C /A	B/S /C /A		

Comparative Analysis

Administration and Economy in City

(1)The significance of differentiation. The administrative grade and the economic grade are significantly related to the e-government service capacity, which is basically unrestricted by the channel.

(2) Capacity distribution in different channel. The e-government services capacity distribution of channel ranking is inconsistent between administration and economy, and it is not affected by economic grade.

(3)Balance of differentiation grade. The grade ranking distribution of difference degree is not consistent between administration and economy grade, which are both very highly correlated with channel.

(4)Balance of channels. The channel ranking distribution of difference degree between administration and economy grade is not consistent, which are both very highly correlated with grade.

(5)The overall comparison. On the one hand, the difference degree between channels in administrative differentiation is higher than that in the economy, which is not limited by grade. On the other hand, the difference degree between grades of administrative differentiation is lower than the economy, which is not restricted by channels.

Cities and Provinces in Economy Differentiation

(1)The significance of differentiation. In terms of relevance, only e-government service capacity of city is significantly correlated with economic grade and is not restricted by channels.

(2) Capacity in different channels. The distribution of e-government services capacity in different channels are inconsistent between province and city. For example, the Microblog service capacity in province government is more prominent, but the website service capacity in city government is more outstanding, which is not limited by the grade.

(3)Balance of differentiation grades. The grade distribution of difference degree is not consistent between province and city, which are both very highly correlated with channel.

(4)Balance of channels. The channel ranking distribution of difference degree is not consistent between province and city, which are both very highly correlated with grade.

(5)The overall comparison. In the same economic grade, service capacity of the province government is higher than that of city, and it is basically unrestricted by the channels. In addition, difference degree in the service ability of province are basically higher than that of the city.

Cities and Provinces in Regions Differentiation

(1)E-government service capacity in different regions. Government service capacity distribution of city and province in different regions are both different, and they are both significant restricted by service channels.

(2)E-government service capacity in different channels. The ranking distribution of e-government service capacity in different service channels of city and province are different, and they are both not significant restricted by region.

(3)Balance of regions. The capacity difference degree in region distribution of cities and provinces are not consistent, which are both highly correlated with the channel.

(4)Balance of channels. The capacity difference degree in region distribution of cities and provinces are not consistent, which are both highly correlated with the region.

(5)The overall comparison. The difference government service capacity of the province is higher than that of the city. The capacity difference degree of varies channels of the province is lower than the city.

Suggestions

Based on the above comparative analysis, this paper sums up the regulation of the differentiation attributes such as the administrative, economic, region and the government type such as city and province for China government. The detailed as shown in table 10.

Table 10. Conclusion of E-government Service Capability for China Government.

Attribute	Element	Object	Revelation
Administration and Economy in City	Intensio-n	Grade Balance	The intensity of the level balance required for different channels is different, and the administration and economy have different priorities.
		Channel Balance	The intensity of the channel balance required for different levels is different, and the administration and economy have same priorities.
	Directio-n	Ability at Grades.	The direction of the level improvement required for different channels is the same, and administration and the economy have same priorities.
		Ability at Channels	The direction of channel improvement required for different levels is different, and administration and the economy have different priorities.
City and Province in Economy Differentiation	Intensio-n	Grade Balance	The intensity of the level balance required for different channels is different, and the cities and provinces have different priorities.
		Channel Balance	The intensity of the channel balance required for different levels is different, and the cities and provinces have same priorities.
	Directio-n	Ability at Grades.	The direction of the level improvement required for different channels is different, and the cities and provinces have different priorities.
		Ability at Channels	The direction of the channel improvement required for different levels is the same, and the cities and provinces have different priorities.
		Contrast	The control intensity of the province is higher than that of the city.
City and Province in Region Differentiation	Intensio-n	Region Balance	The intensity of the region balance required for different channels is different, and the cities and provinces have different priorities.
		Channel Balance	The intensity of the channel balance required for different regions is different, and the cities and provinces have different priorities.
	Directio-n	Ability at Regions	The direction of the region improvement required for different channels is different, and the cities and provinces have different priorities.
		Ability at Channels	The direction of the channel improvement required for different regions is similar, and the cities and provinces have different priorities.
	Contrast	Contrast	The control intensity of the province is higher than that of the city in the channel balance regulation.

Conclusion

First of all, this paper supports the important influence of the differentiation attributes. The administrative grade and the economic grade both have a significant positive correlation with the e-government service capacity in city, especially in new social media, which illustrates the phenomenon from multiple service channels. Secondly, the capacity distribution characteristics of channels are

revealed.(1) The competencies distribution on channels ranking varies related to differentiation attributes of administrative and economic and government of city and province, which provides direction for balancing service reference.(2)Capacity difference degree of administrative grade, economic grade and regions are all closely related to channels.(3)Capacity difference degree of varies channels is closely related to administrative, economic and regions attributes. Finally, because different channels have different degree of administrative, economic and regional difference, the paper provides a reference to balance e-government service capacity for China government.

The limitations of this article are as follows. First, analysis data just comes from one year, which needs to be tested over several years. Second, the analysis data only comes from mainland China, which needs to be further tested over other countries. Third, the work is descriptive, which remains to be demonstrated in other ways.

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