

## An Empirical Study on the Influencing Factors of Digital Government Service Level

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**Abstract.** Since the 18th National Congress of the Communist Party of China, my country has attached great importance to promoting the modernization of the national governance system and governance capacity through informatization. The digital government service level is an effective means to improve the efficiency of government public services and build a government that people are satisfied with. This paper puts forward theoretical assumptions about the influencing factors of digital government service level from the perspectives of government, society and citizens. Through the panel data of my country's provincial government from 2016 to 2020, the fixed effect model is used to empirically test the influencing factors of digital government service level. The results put forward corresponding countermeasures and suggestions to better improve the level of digital government services.

Keywords: digital government · government services · influencing factors

### 1 Introduction

With the rapid development of new information technologies such as the Internet, big data, and blockchain in the world, they are integrated into people's daily life. Nowadays, various countries attach great importance to the construction of digital government through information technology, and government departments of various countries are increasingly aware of the important value of digital government government services. All parties agree that the traditional government is moving towards a digital government. After years of development, my country has gradually transitioned from the stage of simply emphasizing e-government to the stage of digital government that applies digital means to the whole process of public services.

The Fourth Plenary Session of the 19th Central Committee of the Communist Party of China proposed to innovate administrative management and service methods, improve administrative efficiency, build a service-oriented government that the people are satisfied with, accelerate the promotion of a national integrated government service platform, and promote the construction of digital government and other key tasks. The Fifth Plenary Session of the 19th Central Committee of the Communist Party of China clearly stated: "Strengthen the construction of digital society and digital government, and improve the level of digital intelligence in public services and social governance". All of which reflect the country's emphasis on digital government and digital government services.

#### 2 Literature Review

The research on digital government started early in foreign countries, and the related research and theories are relatively rich. The research in China started relatively late, but the related theoretical innovations are very rich, especially since the digital government construction was proposed at the 19th National Congress of the Communist Party of China. Theoretical and practical research has entered a new stage. In foreign research on digital government services, in terms of research content, Turuy (2021) believes that "data quality, efficiency, public value, data infrastructure, people and organizations, policies and regulations, applications and services are seven dimensions to promote the opening of government service data., Dwivedi (2017) believes, "Strengthening the field of theoretical research in government services by enhancing research topics such as electronic participation, transparency, interaction, trust, security, and collaboration.". In terms of research countermeasures, Dzikrullah (2017) believes that "interoperability has become an important requirement for e-government infrastructure, and the quality of public services is improved through information technology. The establishment of traditional information systems and intelligent systems based on big data technology combine intelligent digital government government systems", Berlilana (2018) believes that "citizens' perceived e-government availability and perceived e-government credibility have a positive impact on the intention to use e-government services".

In domestic research on digital government services, in terms of research content, Xu (2021) believes that "deepening the reform of my country's government services from the four dimensions of data itself, organizational collaboration, institutional guarantees, and digital governance provides a reference for promoting the modernization of national governance capabilities and governance systems. Jiang (2021) believes that "the construction of a digital government service platform needs to be systematically promoted from the aspects of value, organization, system, technology, etc.", in terms of research countermeasures, Deng (2020) believes that "it should focus on three aspects: institutional empowerment, model innovation, and technological empowerment". Make joint efforts to unblock the innovative diffusion path of digital government service construction". Li (2021) believes that "in practice, stakeholders should be integrated through multiple channels; public service resources should be drawn from multiple dimensions; and public service delivery should be coordinated in an all-round way".

To sum up, in quantitative research, most of them take the perspective of public satisfaction and adoption willingness to study the factors that affect public participation. Few scholars conduct quantitative research on digital government services from the perspective of influencing factors. The research on digital government services also lacks the supplementary and quantitative analysis methods of influencing factors. Therefore, through further in-depth quantitative research on the influencing factors of digital government services, the related research on digital government services should be improved.

## 3 Research Design

#### 3.1 Theoretical Analysis and Hypothesis Formulation

The development of digital government service level is a comprehensive project, and it is necessary to unify the internal and external factors of the government. In the research field related to digital government, some scholars use the TOE framework to analyze the influencing factors through technical management, organization and environment; From the perspective of citizen adoption, it analyzes the influencing factors of government and public acceptance of e-government through models such as technology adoption and utilization integration model and technology acceptance. This paper constructs a system of factors influencing the service level of digital government from the three dimensions of government, society and citizens, in order to improve the comprehensiveness and systematicness of the research.

1. Government factors. The government's own efforts and the importance the government and its officials place on digital government services determine the final level of government services. Therefore, the first hypothesis of this paper is proposed:

H1: The stronger the government's investment and attention, the higher the level of digital government services.

2. Social factors. Upper decision decided by the economic background. The construction of digital government and the improvement of digital government services are inseparable from the support of economic strength and social science and technology. Social factors play an indispensable role in digital government services. Therefore, the second hypothesis of this paper is proposed:

H2: The higher the level of social economic development and informatization, the higher the level of digital government services.

3. The civic factor. The service object of digital government services is citizens. To improve the level of digital government services is to better meet the needs of citizens, and it also requires continuous supervision and feedback from citizens. The two-way interaction between the government and citizens continuously improves the level of digital government services. Therefore, the third hypothesis of this paper is proposed:

H3: The higher the level of participation and education of citizens, the higher the level of digital government services.

#### 3.2 Variable Selection and Data Sources

#### 3.2.1 The Explained Variable

Digital Government Service Levels (Govs). The provincial government online government service capability index is selected as a variable to measure the service level of digital government. The "Survey and Evaluation Report on the Online Government Service Capability of Provincial Governments and Key Cities" issued by the Government Affairs Research Center of the Central Party School has so far released the provincial government online government service capability index from 2016 to 2021. The time range is relatively large. The index is based on The establishment of five indicators of online service effectiveness, online processing maturity, completeness of service methods, coverage of service items, and accuracy of handling guidelines can effectively reflect the user perception and evaluation of online government services. Compared with other evaluation agencies, the data has a longer time span and is more authoritative and scientific.

#### 3.2.2 Government Explanatory Variables

Government investment in science and technology (Gist). Compared with other government spending projects such as management, public services, or talent introduction policies, government science and technology spending can better represent the government's emphasis on and investment in digital government services. The proportion of the general public budget expenditure in the region is used to measure the government's investment in science and technology. Infrastructure Construction Level (IL). The relevant infrastructure construction level of digital government is the premise and basic condition for digital government services. The construction and application of 5G base stations, blockchain, big data centers, etc. can well reflect the construction level of digital government infrastructure, but the related construction has started. Soon, the time span is not long, and it is difficult to obtain relevant provincial statistics. Therefore, the infrastructure level is represented by the number of mobile Internet users in the total regional population at the end of the year.

#### 3.2.3 Social Explanatory Variables

Economic Development Level (Pgdp). The level of economic development is an important indicator for measuring regional development. A series of procedures such as the construction, operation and maintenance of digital government service platforms, and the recruitment and training of relevant technical personnel all require financial support. Value to measure the level of regional economic development. Information level (Tp). The higher the level of informatization in a region, the higher its digital government construction capability and level will be. Mobile phones have become the largest terminal for the public to access the Internet in my country, and mobile government affairs are also becoming the main way for the government to communicate with the public in digital government services, in which mobile phones play a media role. to measure the level of regional informatization.

#### 3.2.4 Citizen Explanatory Variables

Civic Participation Level (ppl). The service object of digital government is the people, and social organizations and autonomous organizations are important carriers for citizens to participate in political life. Therefore, this paper measures the level of public participation by the ratio of the sum of regional social organizations and autonomous organizations to the total population at the end of the year. Educational level (el). The education level of citizens will affect the level of citizens' participation in digital government services. The higher the education level, the more likely they are to make more suggestions on digital government services and promote the development of digital government. Therefore, this paper measures the educational level of the region by the proportion of the number of people with higher education in the total population of the region (Table 1).

Code	Variable	Indicator
Govs	Digital government service level	online government service capability overall index
gist	Science and technology investment	Science and technology expenditure/regional general public budget expenditure
IL	Infrastructure construction level	Number of mobile Internet users/total population at the end of the year
Pgdp	Economic development level	GDP per capita
Тр	Informatization level	Telephone penetration rate (including mobile phones)
ppl	Citizen participation level	The sum of social organizations and autonomous organizations /regional total population at the end of the year
el	Educationa level	Number of people with higher education/total population of the region

Table 1. Variable description and data source

#### 3.3 Model Setting

Based on the needs of quantitative analysis, according to the research assumptions and variable settings above, the following regression equation can be constructed:

$$\begin{split} Govs_{it} = & \beta_0 + \beta_1 gist_{it} + \beta_2 il_{it} + \beta_3 pgdp_{it} + \beta_4 tp_{it} + \beta_5 ppl_{it} \\ & + \beta_6 el_{it} + \epsilon_{it} \end{split}$$

In the equation, each code is the explained variable and explanatory variable described above,  $\beta$  is the coefficient to be estimated for each variable,  $\beta 0$  represents the constant term, and  $\epsilon$ it is the random error term.

#### 4 Empirical Test

#### 4.1 Descriptive Statistics

This table is the result of descriptive statistics of the collected variable data after logarithmic processing. The panel data includes 31 provinces with a time span of 5 years and 155 samples in each variable (Table 2).

It can be seen from the table that during the five years from 2016 to 2020, the average digital government service level index of 31 provinces in my country was 82.01, and the median was 81.99, which indicated that the overall digital government service level in the country was at a high level. However, from the standard deviation of 8.055, the maximum value of 96.73 and the minimum value of 50.44, it can be seen that there is a significant gap in the service level index of various provinces. It can be observed from

Variables	(1)	(2)	(3)	(4)
	mean	sd	min	max
Govs	82.01	8.055	50.44	96.73
gist	0.0220	0.0158	0.00303	0.067
il	0.911	0.200	0.518	2.115
Pgdp	6.457	2.949	2.764	16.49
Тр	1.234	0.257	0.797	2.129
ppl	10.79	2.840	7.213	20.27
el	0.154	0.0769	0.0530	0.505

Table 2. Decriptive statistics

the original data that the main provinces in the eastern coastal areas are ranked high, and the western provinces are ranked low. There is a huge disparity in the level of digital government services between provinces.

Among the independent variables of government factors, the data on the intensity of science and technology investment shows that the proportion of government expenditure on science and technology in different provinces in the general public budget expenditure is quite different, and the largest difference in the proportion of science and technology investment is 6.46%. Considering the different scales of public budget expenditure in different provinces, the actual difference is more obvious. In the variable data of infrastructure construction level, the overall Internet infrastructure construction level is relatively high, but there are significant regional differences. In the highest provinces, many residents have registered more than 2 mobile Internet user accounts, while in the lowest provinces, mobile Internet users only account for 50% of the regional population. A digital divide has emerged.

Among the independent variables of social factors, in the data of economic development level, the average of 6.457 is greater than the median of 5.422, indicating that my country's per capita GDP is relatively high, but the gap between the minimum value of 2.764 and the maximum value of 16.49 is too large, indicating that the per capita regional production of different regions The disparity in gross value is far greater in the eastern coastal areas than in the western areas. In the mobile phone penetration rate data, the statistical results of mobile phones including mobile phones per 100 people show that the phone penetration rate in some provinces is low, less than 80%, and a considerable number of people do not understand or even cannot participate and enjoy because they do not have mobile devices. Facilitation services for digital government.

Among the variables of citizen factors, the data on the level of citizen participation shows that the general public has abundant channels to participate in public life and can participate in digital public governance and services. In terms of education level, the proportion of people with higher education in different regions varies significantly, with the highest gap being nearly 45%. In the original data ranking, the proportion of the population with higher education in Beijing is much higher than that of other

	Govs	gist	il	Pgdp	Тр	ppl	el
Govs	1						
gist	0.639***	1					
il	0.413***	0.548***	1				
Pgdp	0.477***	0.755***	0.729***	1			
Тр	0.387***	0.569***	0.907***	0.794***	1		
ppl	0.244***	0.300***	0.0800**	0.129**	0.0140*	1	
el	0.195**	0.524***	0.820***	0.792***	0.795***	0.178**	1

Table 3. Correlation analysis

provinces, indicating that Beijing has a leading education level, sufficient talents, and the construction and service level of the digital government is relatively advanced.

#### 4.2 Correlation Analysis

Through the correlation analysis, it can be preliminarily judged that all the hypotheses are established, and all the explanatory variables have a significant positive correlation level with the explained variables. The stronger the government's investment and emphasis, the higher the economic and technological development level of the society, and the higher the level of citizens' participation and education, the service level of the digital government will be significantly improved (Table 3).

#### 4.3 Regression Analysis

Due to the fact that there are only a few years of data statistics about the explained variable, namely, the evaluation of the digital government service level, the results of the time effect test have no practical significance, so it directly enters the panel data regression analysis stage. The P value of the Hausman test is less than 0.05, so the Stata15.0 software is used, and the fixed effect model is selected to perform regression analysis on the data (Table 4).

The regression data shows that the three experimental hypotheses of this study have finally been empirically tested. The government's investment in science and technology, the level of infrastructure construction, the level of economic development, the level of informatization, the level of public participation, and the level of education of citizens have a significant positive correlation with the level of digital government services.

VARIABLES	govs	
gist	220.771***	
	(4.82)	
il	25.813***	
	(2.62)	
Pgdp	1.064***	
	(3.29)	
Тр	3.583*	
	(0.57)	
ppl	0.444**	
	(1.99)	
el	84.143**	
	(6.85)	
Constant	68.980***	
	(21.10)	
Observations	155	
R-squared	0.564	

Table 4. Regression analysis

Robust t-statistics in parentheses \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

#### 4.4 Robustness Check

In order to improve the consistency, stability and reliability of the regression analysis results, this paper adopts the method of replacing variables to measure the robustness test. Considering it comprehensively, this paper replaces the indicators of three variables, namely, the investment in science and technology, the level of economic development, and the level of public participation. For science and technology investment, the ratio of the number of patent grants to the regional population at the end of the year is used to measure; for the level of economic development, it is measured by the per capita regional public budget revenue; for the level of citizen participation, it is measured by the user experience of government services. In order to distinguish it from the original index, the above three variables are represented by nop, pb, and ue respectively. The results of the regression analysis after substituting the variable measures are shown in the table below.

After substituting the measures of variables, it still passed the significance test of all 6 variables. The hypotheses and variables proposed in this study were also supported in robustness tests (Table 5).

VARIABLES	govs
nop	0.0764***
	(1.43)
il	23.427 ***
	(2.12)
pb	11.581***
	(5.36)
Тр	2.846 *
	(0.54)
ue	0.965 **
	(1.03)
el	60.125***
	(5.98)
Constant	52.386***
	(20.96)
Observations	155
R-squared	0.526

Table 5. Robustness check

Robust t-statistics in parentheses \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

## 5 Conclusions

Based on the data of 31 provinces in my country from 2016 to 2020, this paper uses a fixed effect model to analyze and test the government, society, and citizens influencing factors of digital government service level, and proposes that all three hypotheses have been verified. To improve the service level of digital government, the government, society and citizens are indispensable and play a very important role. Through empirical analysis and conclusions, the following suggestions are put forward to promote the continuous improvement of China's digital government services.

# 5.1 Increase Investment in Science and Technology and Improve Infrastructure Construction

The regression coefficient of science and technology investment is greater than other explanatory variables, indicating that the level of digital government services is greatly affected by the government's investment. Therefore, it is necessary to strengthen the government, especially the governments of the underdeveloped areas in the west, to pay more attention to the digital government service platform, and continue to increase the input of human, financial, material and resources such as maintaining science and

technology. The level of infrastructure construction has a very significant positive impact on the level of digital government services. The government should cooperate with enterprises to continuously improve and enrich the functions of government service platforms and further improve infrastructure construction. Digital government-related service level indicators can be incorporated into the government performance evaluation system to better enhance the government's enthusiasm.

#### 5.2 Promote Economic Development and Deepen the Level of Informatization.

Improve the digital government service platform to optimize the approval procedures, continue to deepen the "decentralization, regulation and service reform", reduce the administrative approval process of social enterprises, improve the approval efficiency, build a new business environment, optimize government services, introduce relevant preferential policies to attract investment, strengthen government guidance, Promote the development of digital economy with digital government. Further improve the leader-ship coordination mechanism, improve informatization laws, regulations and standards, deepen the application of information technology, strengthen the development and utilization of information resources, increase independent innovation in the information industry, broaden the investment and financing channels for informatization, improve the level of informatization, and strengthen informatization research on basic work.

#### 5.3 Encourage Citizen Participation and Improve Educational Attainment

The government should strengthen the disclosure of government information, improve the transparency of government and digital government service platforms, continue to improve citizen participation channels, such as official accounts, government service APP software, etc., attach importance to and optimize citizen supervision and feedback channels, and improve the ageing suitability of digital government service platforms., The level of humanization, we must not only pay attention to the government's own problems, but also actively solve the problem of citizen participation, improve the level of citizen participation, narrow the distance between the government and citizens, and gradually form a positive interaction between the government and citizens. Pay attention to the cultivation of talents. Professional talents are an indispensable foundation for digital government services. To attach importance to the cultivation of digital technical talents, the government should establish digital thinking, carry out digital education, and educate citizens about digital popularization in order to better improve quality of civic engagement.

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