The impact of digital government on government trust

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Abstract. Government trust is one of the sources of government legitimacy and an important foundation for social stability and governance. Based on provincial panel data in China, explore the direct role of digital government in government trust and the mediating role of government evaluation. Research has found that digital government has a significant promoting effect on government trust, and government evaluation has a mediating effect on the impact of digital government on government trust. Therefore, government departments should actively promote the development and application of digital technology, and scientifically formulate standards for government evaluation to build a strong chain of trust transmission.

Keywords: government trust, digital government, government evaluation

1. Introduction

The trust of the people in the government is the result and cornerstone of good governance. On the one hand, the public's trust in the government can reduce the resistance to the government's implementation of new policies, which plays an important role in deepening reforms and enhancing governance capabilities; On the other hand, effective governance can eliminate problems, continuously improve the happiness and sense of gain of the people, make them more confident in the government's ability, and form a virtuous cycle. The most direct consequence of a decrease in trust may be citizens' disregard for government initiatives and laws and regulations, and may even resort to extreme and violent means to express their demands because they do not believe that the government can solve problems. This is manifested in the increasing number of violent incidents, and the relationship between the government and the public becomes tense. This confrontational relationship worsens the government's situation and weakens its ability to truly solve problems. The government is thus trapped in a vicious cycle. When the government loses trust, even if it speaks the truth, does practical things, and does good deeds, it will still be regarded as lying, pretending, or even doing bad things. Therefore, studying the influencing factors of government trust and exploring the principles of trust generation and loss is crucial for the government to enhance governance efficiency. Since the last century, scholars have conducted relevant research, and the conclusion shows that many factors such as politics, society, and culture can affect government trust. Nowadays, we are gradually entering the digital age, and the development and application of digital technology have brought about many new things. For the government, the construction of a digital government has promoted the emergence of many online convenient services, optimized work processes, and improved government efficiency and governance capabilities. However, the application of technology has also exposed many problems, such as public concerns about privacy protection. So, will the construction of a digital government promote public trust in the government?

2. Literature review

Since the trust crisis in the United States in the last century, scholars have explored the possible influencing factors of government trust from different perspectives to prevent the worsening trust crisis. At present, there are two mainstream perspectives, namely the institutionalist perspective and the culturalist perspective [1], or also known as institutional performance theory and social capital theory [2]. The institutional performance theory defines government trust as the public's evaluation of the level of government governance [3], and believes that good government performance can improve the level of government trust [4]. Social capital, on the other hand, starts from the sociality of human beings. Due to different cultures, education, experiences, and ideas, there are certain differences in government trust between individuals and groups [5]. In the early stages of related research, coinciding with the emergence of public choice theory, the perspective of institutional analysis became mainstream. People rationally examine the actions of the government, determine their trust in the government through evaluation, and use rational evaluation of government performance as the source of government trust [6]. Therefore, the

government can enhance trust by improving public welfare, reducing corruption, or maintaining democratic systems [7]. A higher level of government performance will significantly enhance the public's trust in the government [8]. It mainly includes the following aspects: economic benefits such as economic development level [9], wealth distribution situation [10], economic crisis [11], and public affairs such as public service level, governance level, public safety, policy effectiveness, social equity, etc. [12]. In addition, the moral standards and self-regulation of the government can also affect the level of trust that the public has in the government. If government officials show a friendly and caring personality, or qualities such as honesty, trustworthiness, and dedication to their work, they will win the satisfaction and trust of the public [13]. However, the exposure of scandals, corruption, dereliction of duty, and poor service attitudes can seriously damage the public's trust in the government [14].

Domestic scholars have also explored the factors influencing government trust from different perspectives. In the early stages of research, scholars' studies were relatively shallow, believing that high-level economic development could enhance government trust, while income inequality would reduce government trust [15]. With the deepening of research, scholars have found that there is a typical characteristic of "strong central government and weak local government trust" in China [16]. And it is easily subject to fluctuations due to social events [17]. From a performance perspective, improving channels for political participation can effectively enhance the level of government trust [18]. From a cultural perspective, government trust is not related to people's religious beliefs [19]. But it is influenced by traditional values, and this influence is constantly weakening [20].

There are two opposing views on the impact of technological applications on government trust. One side believes that the rapid development and application of technology have had an impact on the traditional trust foundation, making it easier to incite opposition between officials and the public on self media platforms [21]. On the other hand, it is believed that using social media to provide supplementary channels for information dissemination and communication, enabling the public to easily obtain the right to know and participate in government social governance work, can improve people's satisfaction and trust [22].

In summary, the formation mechanism and development path of government trust have significant regional differences and temporal characteristics, and its research context presents a distinct academic evolution trajectory. In the Western academic community, the study of government trust originated from the legitimacy crisis that commonly existed in the late 20th century. By integrating theoretical resources from multiple disciplines such as political science and sociology, a mainstream explanatory path for institutional analysis was gradually constructed. Although the systematic research on government trust in the Chinese academic community started relatively late, many valuable conclusions have been drawn based on the country's political system and social situation. However, although it has been proven that the application of technology can affect government trust, its mechanism of action is still controversial. Different scholars have drawn different or even opposite conclusions based on different groups, times, and samples. Therefore, it is necessary to conduct targeted exploration on the application of digital technology. In addition, for the government, government trust requires the support and trust of the majority of people within a certain range, rather than everyone. Therefore, using provincial-level macro data can provide more accurate references for government actions.

3. Theoretical basis and research hypothesis

From the perspective of institutional performance theory, it is believed that the government can take the initiative to win the trust of the people through high performance. Based on the theory of new public management, policy practice has shown that digital technology can effectively improve the administrative efficiency of the government, compress response time, and enhance the level of public services. For example, Hangzhou City in Zhejiang Province has created a "city brain" to improve government services through one-stop service, enhance urban safety through one-stop management, and improve governance through one-stop governance. This innovation in institutional supply based on intelligent technology will obviously enhance the public's evaluation of government performance, thereby increasing their trust in the government.

The theory of public value emphasizes that government governance should be guided by the values expected by the public. The government can achieve public goals such as diverse participation, social equity, economic development, sustainability, public safety, education, and health to achieve public value and gain recognition from the people. Specifically, one is diversified participation. Digital technology can build a more convenient communication and interaction platform between the government, enterprises, and the public, allowing them to participate in public issues and deepen their trust in the government. The second is social equity. Digital technology breaks spatial limitations and provides public services for vulnerable groups, which is beneficial for the government to achieve social equity. The third is economic development. On the one hand, digital technology can empower traditional industries and form new economic growth points. On the other hand, digital technology enables the government to integrate internal resources, simplify business processes, and optimize the business environment. The fourth is sustainability. Digital technology can be used for real-time monitoring and analysis of environmental data, supporting the scientific formulation and dynamic adjustment of policies such as carbon emission control and pollution control. The fifth is public safety. Through the analysis of urban monitoring data and natural disaster data, it can help the government achieve effective early warning, assist the government in quickly initiating emergency mechanisms, and maintain public safety. Sixth, education. Digital technology can facilitate the sharing of knowledge such as books and papers, providing people with more high-quality online educational resources and alleviating the imbalance of educational resources between regions. Seventh,

health. Technologies such as telemedicine and electronic health records can optimize the allocation of medical resources and enhance the capacity of primary healthcare services. Of course, the use of digital technology may also hinder the achievement of public goals, such as data leakage issues, which may lead to privacy breaches and even foster related black and gray industries. The second issue is the misuse of technology, algorithmic bias exacerbates social injustice, and governance tools are transformed into control measures. The third issue is the lack of effective supervision, due to outdated laws and unclear delineation of rights and responsibilities, which makes it difficult to hold accountable for problems caused by technology.

In summary, we can outline the impact path of digital government construction on government trust, the concept of digital government, and its development that can enhance the administrative efficiency of the government and enable it to handle affairs more efficiently; Can enhance transparency and facilitate public supervision; Can help the government better understand public needs and optimize policy formulation; Being able to allocate resources more accurately and improve the effectiveness and efficiency of public services; Developing digital platforms to facilitate interaction between the government and the public, and promoting public participation. By achieving these public goals and providing better public services, digital government can improve people's evaluation of the government, thereby enhancing government trust.

Based on this, two hypotheses can be proposed.

Hypothesis 1: Digital government has a significant positive impact on government trust.

Hypothesis 2: Government evaluation plays a mediating role in the impact of digital government on government trust.

4. Research design

4.1. Data

According to the research and empirical analysis needs of this article, the data mainly comes from the China Family Panel Studies database and the "Evaluation Report on Provincial Government Online Government Service Capability Survey" released by the E-Government Research Center. Based on the completeness and richness of the data, this article uses data from three years: 2016, 2018, and 2020.

4.2. Introduction of variables

The independent variable digital government is calculated based on several secondary indicators, including service effectiveness, processing maturity, completeness of methods, coverage of issues, and accuracy of guidelines. The score is calculated from the original database, and the higher the score, the higher the level.

The dependent variable government trust is processed using the answer to the questionnaire question "How much do you trust local government officials?" from the China Family Panel Studies database. The higher the score, the higher the trust level. Different populations in different provinces and cities are distinguished, and their average score is calculated as the indicator of residents' trust in the government in each province and city.

Based on the factors that may affect government trust in the literature review, this article will select the following control variables. Calculate the average years of education by province to measure the education level of each province. The per capita GDP is used to reflect the economic level of each province. Engel coefficient is used to reflect the living standards of each province. The Gini coefficient is used to reflect the wealth gap in each province.

Based on the theory of institutional performance, digital government can influence government evaluation, which in turn affects government trust. Therefore, government evaluation is chosen as the mediating variable. The answer to the question "Evaluation of the local county and city government" in the China Family Panel Studies database is processed, with a score ranging from 1 to 10. The higher the score, the higher the evaluation. Different populations in different provinces and cities are distinguished, and the average score is calculated as the evaluation indicator of the government by residents in each province and city.

4.3. Descriptive statistics

The descriptive statistics of the variables are shown in Table 1.

Table 1. Descriptive statistics of research variables

Variable	Year	Observation	Mean	Std.Dev.	Min	Max
Government Trust	2016	31	4.73	0.54	3.33	5.50
	2018	31	5.16	0.33	4.53	5.86
	2020	31	5.86	0.36	5.44	7.20
Digital Government	2016	31	77.87	8.40	56.33	91.21
	2018	31	82.44	7.66	61.23	94.63
	2020	31	85.60	5.86	73.15	95.38
Education level	2016	31	8.22	1.42	5.53	11.19
	2018	31	8.25	1.48	5.66	12.50
	2020	31	8.82	1.19	6.85	12.00
Economic level	2016	31	2.33	0.50	1.66	3.44
	2018	31	2.50	0.52	1.77	3.74
	2020	31	2.61	0.53	1.90	4.06
Living standards	2016	31	30.88	5.29	21.87	50.04
	2018	31	28.78	3.68	20.47	38.15
	2020	31	28.58	3.56	20.06	37.26
Wealth gap	2016	31	0.43	0.04	0.35	0.50
	2018	31	0.43	0.05	0.35	0.50
	2020	31	0.44	0.05	0.35	0.51

It can be seen that there has been a significant increase in government trust over the past three years, with an average value rising from 4.73 to 5.86, a minimum value rising from 3.33 to 5.44, and a maximum value rising from 5.50 to 7.20. However, the standard deviation is narrowing, indicating a decreasing trend in regional differences. The trend of digital government is similar, with its mean increasing year by year, reflecting the continuous development of digital government, while its standard deviation is decreasing, indicating that regional differences are constantly decreasing.

4.4. Model

Panel data analysis, as a common method in the field of econometrics, is a multidimensional data structure formed by the organic combination of time series and cross-sectional data. To explore the relationship between digital government and government trust, and how government trust is influenced by independent and controlled variables, the following model is constructed:

$$Tru_{it} = \alpha + \beta_1 Gov_{it} + \beta_2 Control_{it} + \sigma_i + \mu_t + \varepsilon_{it}$$

Among them, Tru_{it} is the government trust of the i-th region in the t-th year; Gov_{it} represents the digital government level of the i-th region in the t-th year, while $Control_{it}$ is the other control variables mentioned earlier: education level, economic level, living standard, and wealth gap. μ_t represents the time effect, σ_i represents the individual effect, and ε_{it} is the random perturbation term.

The mediating effect refers to the mechanism by which the influence of the explanatory variable X on the dependent variable Y is partially or completely transmitted through the mediating variable M. The specific process is represented by the following three regression equations:

Direct effect test: $Y = cX + e_1$

Path verification: $M = aX + e_2$

Effect decomposition test: $Y = c'\,X + bM + e_3$

Among them, a represents the effect of the explanatory variable X on the mediator variable M, b represents the degree of influence of the mediator variable M on the dependent variable Y after controlling for the explanatory variable X, the product of a and b is the size of the mediator effect, c is the total effect of the explanatory variable X on the dependent variable Y, $c = ab + c'$, c' represents the effect of X on Y after controlling for the mediator variable M. e_1, e_2, and e3 in the equation are the residuals of each equation. When c' is not significant, it indicates that the influence of X on Y is completely transmitted through M. When c' is still significant but the value decreases, it indicates that X has both direct and mediating effects on Y.

5. Results

5.1. Regression results

The regression results are shown in Table 2.

Table 2. Regression results

Variable	(1) Government Trust	(2) Government evaluation	(3) Government Trust
Digital Government	0.047**	0.029*	0.028**
	(0.019)	(0.016)	(0.014)
Government evaluation			0.662***
			(0.134)
Education level	0.085	0.069	0.040
	(0.126)	(0.128)	(0.055)
Economic level	0.996*	1.076	0.284
	(0.527)	(0.634)	(0.353)
Living standards	-0.065	-0.018	-0.053
	(0.040)	(0.035)	(0.033)
Wealth gap	1.214	-0.711	1.685**
	(1.280)	(1.327)	(0.771)
Constant	-0.412	3.963*	-3.036
	(2.528)	(2.094)	(1.901)
Individual fixation	YES	YES	YES
Fixed time	YES	YES	YES
Observation	93	93	93
R^2	0.564	0.487	0.691
Number of provinces	31	31	31

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

The development of digital government has a significant promoting effect on government trust, and government evaluation plays a partial mediating role in it. Specifically, the results of column (1) show that the coefficient of digital government is 0.047, which is positive and has a P-value less than 0.01, indicating that digital government has a significant positive promoting effect on government trust. The results of column (2) show that the coefficient of digital government is 0.029, which is positive and has a P-value less than 0.01, indicating that digital government can significantly promote government evaluation. The results of column (3) indicate that the coefficient of digital government has decreased from 0.047 to 0.028, and the coefficient of government evaluation is 0.662. The coefficient is positive and the P value is less than 0.01, indicating the existence of a mediating effect of government evaluation. According to Sobel test, the mediating effect of government evaluation on the influence of digital government on government trust accounts for 39.6%.

5.2. Robustness analysis

To ensure the robustness of the research conclusions, this study used the core variable replacement method to retest the baseline regression results. This article selects new data to reconstruct indicators for measuring government trust. The data used comes from the trust in public institutions in the China Family Panel Studies database, and is calculated by distinguishing provinces to obtain new provincial government trust, which is then used to replace the previous government trust for robustness testing. The regression results are shown in Table 3.

Table 3. Robustness test regression results

Variable	(1) Government Trust	(2) Government evaluation	(3) Government Trust
Digital Government	0.036***	0.029*	0.022**
	(0.012)	(0.016)	(0.009)
Government evaluation			0.460***
			(0.091)
Education level	0.056	0.069	0.024
	(0.079)	(0.128)	(0.048)
Economic level	0.815**	1.076	0.320
	(0.372)	(0.634)	(0.275)
Living standards	-0.025	-0.018	-0.017
	(0.026)	(0.035)	(0.022)
Wealth gap	0.702	-0.711	1.029*
	(0.927)	(1.327)	(0.546)
Constant	1.088	3.963*	-0.734
	(1.532)	(2.094)	(1.071)
Individual fixation	YES	YES	YES
Fixed time	YES	YES	YES
Observation	93	93	93
R^2	0.595	0.487	0.727
Number of provinces	31	31	31

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

It can be seen that the coefficient of digital government in column (1) is 0.036, indicating that it has a significant promoting effect on government trust. The coefficient of the effect of digital government on government evaluation in column (2) is positive and the P value is less than 0.01, indicating that digital government has a significant promoting effect on government evaluation. The coefficient of digital government in column (3) is positive and the P value is less than 0.01, proving that digital government has a significant direct promoting effect on government trust, and at the same time, it has a significant promoting effect on government trust through the mediating effect of government evaluation. This conclusion is consistent with the previous text, indicating that government evaluation has a robust mediating effect on the influence of digital government on government trust.

5.3. Endogeneity analysis

There may be a reverse causal relationship between the explanatory variable and the dependent variable selected in this article. In order to make the research conclusions more reliable, the dependent variable will be estimated one period in advance to control for endogeneity effects. The regression results are shown in Table 4.

Table 4. Endogeneity test regression results

Variable	(1) Government Trust	(2) Government evaluation	(3) Government Trust
Digital Government	0.025**	0.029**	0.016
	(0.010)	(0.012)	(0.010)
Government evaluation			0.290***
			(0.107)
Education level	0.101*	0.069	0.081
	(0.057)	(0.067)	(0.055)
Economic level	1.296***	1.076**	0.984***
	(0.356)	(0.417)	(0.357)
Living standards	-0.148***	-0.018	-0.143***
	(0.030)	(0.035)	(0.028)
Wealth gap	0.999	-0.711	1.205
	(0.848)	(0.993)	(0.809)
Constant	3.649**	3.963**	2.500
	(1.652)	(1.934)	(1.624)
Individual fixation	YES	YES	YES
Fixed time	YES	YES	YES
Observation	93	93	93
R^2	0.776	0.487	0.801
Number of provinces	31	31	31

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The coefficient of the core explanatory variable, digital government, is significantly positive, which is consistent with the conclusion in the previous section. Column (2) shows a significant promoting effect of digital government on government evaluation, which is consistent with the conclusion in the previous section. Comparing column (1) and column (3), the coefficient of digital government has changed from 0.025 to 0.016. In column (3), the coefficient of government evaluation is positive and the P value is less than 0.01, indicating that there is an indirect effect of government evaluation on the impact of digital government on government trust. The conclusion is consistent with the previous conclusion, proving that the endogeneity problem in the model will not affect the conclusion of this paper.

6. Conclusion

We are in an era of rapid development, and the development and application of digital technology in government departments have given rise to digital government. People have high expectations for it, but are also full of concerns. The research results show that the development of digital government can significantly improve people's trust in the government, and government evaluation plays a mediating role in it. Therefore, the government needs to actively promote the development and application of digital technology. One is to broaden the online channels for interaction between the government and the public, form a sound online participation mechanism, and achieve convenient and normalized interaction between the public and the government. The second is to improve the government data open platform, achieve data exchange between different departments and openness to the public, and enhance government transparency. The third is to optimize the level of government services and improve the efficiency of government affairs. By using artificial intelligence technology to intelligently identify and classify government service demands, precise positioning and rapid disposal of livelihood issues can be achieved, and government services can be upgraded from "one size fits all" to "personalized", providing the public with more convenient and efficient digital government services. The fourth is to enhance governance capabilities, such as relying on unified urban management and digital platforms to achieve grid management, and relying on big data models to achieve disaster prediction, early warning, and prevention. On the other hand, the government also needs to further optimize the channels for generating trust, optimize the government evaluation index system, so that it can help enhance government trust. One is to introduce third-party evaluation and public participation mechanisms, and make the results public to make government evaluations more authentic and reliable. Secondly, the evaluation

index system should be dynamically adjusted based on people's existing demands, so that government evaluation can truly reflect the will of the people and promote government departments to solve urgent problems for the people in a timely manner.

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