

Study on the Mechanism of Enhancing Public Access to Digital Government Construction--Sociological Interpretation of Law Based on Empirical Evidence

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Abstract. This paper integrates data from the 2022 Survey on Netizens' Social Consciousness and the 2022 China Digital Government Development Index Report to construct a mixed cross-sectional dataset (n=1477), and explores the mechanism of digital government construction's impact on the public's sense of gain. First, digital government construction has a significant negative effect on the public's sense of gain, and this conclusion has passed multiple robustness tests such as variable substitution and instrumental variable approach. Second, the mechanism analysis identifies seven moderating variables, including cognition of the rule of law, development of market economy, perception of social fairness, experience of democratic participation, sense of gain from historical development, evaluation of institutional credibility, and satisfaction with political and economic development, all of which statistically significantly alleviate the negative effect. The research conclusion, which is contrary to expectations, indicates an asymmetric transmission between the economic performance improvement of digital government construction and the public's psychological sense of gain. Accordingly, it is suggested that while continuously improving the technical efficiency and economic output of digital government, we should systematically implement the governance strategy of "co-construction, co-governance and shared benefits", focus on improving the mechanism of whole-process people's democratic participation, establish institutionalized channels for public participation in digital governance, and effectively enhance the public's actual sense of gain in the digital transformation.

Keywords: algorithmic administration, governance level, people's democracy, shared benefits, sociology of law

1. Introduction

Digital government construction is an important field and key link in deepening reform comprehensively and promoting the modernization of national governance capacity and governance level, exerting a wide-ranging impact on economic and social development. Since the *Decision of the Central Committee of the Communist Party of China on Upholding and Improving the Socialist System with Chinese Characteristics and Promoting the Modernization of National Governance System and Governance Capacity* adopted at the Fourth Plenary Session of the 19th Central

Committee of the Communist Party of China on October 28, 2019, which stipulated "promoting digital government construction, strengthening the orderly sharing of data, and protecting personal information in accordance with the law", the academic community has systematically discussed the mechanism and regulatory framework of digital government and digital rule-of-law government, practical deficiencies and their adjustments, and conducted in-depth research on path prospects [1,2]. Through quantitative analysis of policy texts, Lv Peian divided digital government construction into three stages: initial accumulation, accelerated development, and fluctuating adjustment. The study found that policy attention in digital government construction focuses on "government", "enterprises", "information", "government affairs", and "industry", from which it can be seen that current digital government construction tends to focus on industrial development and business environment [3]; this tendency effectively reduces enterprises' non-productive expenditures [4], improves regional innovation level [5], and also raises enterprises' foreign direct investment indicators [6].

While achieving important breakthroughs, existing research still has three significant limitations. First, the value orientation overemphasizes economic rationality, excessively focusing on economic performance indicators such as GDP growth and enterprise services. Second, most research on digital government construction is limited to elaboration of social theories and legal dogmatics, with insufficient attention paid to empirical evidence and empirical research. Third, the research dimension is relatively single; existing empirical research on digital government construction focuses on economic performance and government performance indicators centered on economic performance indicators, ignoring the systematic investigation of the vital interests of the people. This academic landscape creates tension with the essential requirement of "people-centered" governance modernization—the ultimate criterion for evaluating national governance effectiveness should be anchored in the improvement of the people's sense of gain. The ultimate goal of the modernization of national governance system and governance capacity promoted by digital government construction is the people's aspiration for a better life. Therefore, in addition to pursuing technical rationality and economic rationality, digital government construction should return to the people-first concept and the people-centered basic principle, emphasizing the improvement of the people's sense of gain.

As an important subjective indicator for measuring governance effectiveness, the sense of gain has formed a multi-dimensional analytical framework in the academic community. In research on the positive impacts [7], negative impacts [8] and related mechanisms [9] of digital government construction on the public, some scholars define the sense of gain as the positive subjective feelings of the people about the achievements of development, reform and construction [10], while others propose the digital sense of gain referring to the public's benefits from digital government construction [11]. In addition, specific research on the "sense of gain" has conducted in-depth discussions on macro aspects such as politics [12], economy [13], and public services [14], and explored the relationship between the "sense of gain" and society [15], psychology [16], and political participation [17] at the micro level. There are also empirical studies promoted by the interaction between the specific external windows of digital government construction (public results of Weibo media and official websites) and public characteristics from the perspective of supply and demand [18], but to a certain extent, the sense of gain is limited to the literal expression of "sense of gain", ignoring more social, political and economic evaluation variables of the public.

Based on the review of the above academic landscape, the core concerns of this paper can be constructed into two progressive propositions. First, breaking through the single perspective of economic performance, can digital government construction enhance the public's sense of gain

through non-economic transmission channels? Second, what is the micro mechanism of this policy effect? To this end, this study integrates multi-source survey data covering 30 provinces, autonomous regions and municipalities directly under the Central Government, empirically tests the driving path of digital government construction on the two-dimensional sense of gain of the public's "perception of a better life – evaluation of governance effectiveness" by constructing a mixed linear model, and strives to provide empirical support for optimizing the value orientation of digital government construction.

2. Research framework, research design and variables

2.1. Research framework and research hypotheses

The fundamental purpose of digital government construction is to meet the people's needs for a better life. The people's feelings and attitudes towards a better life are mainly positive subjective feelings and evaluations formed by the people's current material living conditions and subjective social and psychological states (such as fairness and justice), mainly reflected in the improvement of people's happiness, sense of security and sense of gain [19]. To a certain extent, digital government construction is the construction of government platforms, and its external window has the nature of media. Social comparison theory has inspired research on "relative deprivation" caused by the use of new media [20], and some competing related studies have put forward the viewpoint of "relative superiority".

As a core experience indicator, the formation of the sense of gain is affected by the interaction of three dimensions. The first is the subject dimension, including individual cognition and values; the second is the relational dimension, involving others' evaluations in social comparison; the third is the media dimension, covering the information transmission function of mainstream media. A multi-dimensional analytical framework is constructed, covering 12 core elements such as the public's cognition of the rule of law, judgment of market economy, and perception of social fairness. Among them, satisfaction with current work, life and study has special theoretical value and can be used as the most direct reflection of the sense of gain. This indicator not only constitutes the basic dimension of comprehensive judgment, but also can be disassembled into specific evaluation elements, providing a key path for analyzing the impact mechanism. Based on this, the basic hypothesis is proposed:

H0: The benefits of digital government construction will ultimately be reflected in the public's satisfaction with their current living conditions. A two-stage research framework is established to reveal the impact mechanism.

First Stage: Analysis of Direct Impact Effect

Some scholars view the public's sense of gain from the perspective of public service supply and demand, and empirically conclude that digital government construction positively affects the public's sense of gain [21]. However, some scholars argue that digital government construction has a negative impact on the public's sense of gain. First, digital behaviors such as algorithmic administration in digital government construction exacerbate the digital divide [18]; second, there is great inequality in the possibility and ability of social subjects to obtain digital government public services [22]; finally, the greatly enhanced governance power by digital technology leads to the arbitrary exercise of power by governance subjects over the governed [23]. Therefore, it is not an obvious conclusion whether digital government construction has a positive effect on the public's sense of gain, let alone according to the control theory of public law and administrative law that advocates the tendency of self-aggrandizement of power, the collusion between technology and

power can only be exercised legitimately under reasonable control; otherwise, it will bring greater imbalance and injustice to the governed, thereby reducing the public's sense of gain [24]. Based on this, competing hypotheses are proposed:

H1: Digital government construction positively affects the public's satisfaction with their current living conditions.

H2: Digital government construction negatively affects the public's satisfaction with their current living conditions.

Second Stage: Analysis of Mediating Effect

Since the sense of gain has a complex relationship with the political and psychological factors of groups, it must be included in the investigation of this paper, and the following hypothesis is proposed:

H3: Mediating variables such as trust in social governance have a transmission effect between digital government construction and satisfaction.

2.2. Sample selection and data sources

The data basis of this study is two authoritative data sources provided by Professor Ma Deyong. One is the *2022 Survey on Netizens' Social Consciousness* dataset, and the other is some data indicators from the *2022 China Digital Government Development Index Report*. In terms of analysis methods, Stata 15.0 statistical software is used for empirical testing, and a mixed regression model is constructed to ensure the reliability of the research conclusions. This paper matches the individual questionnaire data of respondents with the relevant data of their provincial administrative regions based on the provincial administrative regions to which the respondents' IP belongs, and then conducts spatial linkage analysis with the digital government evaluation indicators in the *2022 China Digital Government Development Index Report* by the Data Governance Research Center of Tsinghua University. Specifically, based on samples from 30 provincial administrative units (Hong Kong Special Administrative Region, Macao Special Administrative Region, Xizang Autonomous Region and Taiwan Region are reasonably excluded due to insufficient or missing data volume), the survey data are connected with the comprehensive score of digital government and its four dimensions (organizational structure, institutional system, governance capacity, governance effectiveness). The variance inflation factor (VIF) test confirms that there is no significant collinearity among core variables (VIF=1.11), and a unified cross-sectional research dataset is finally constructed.

The data of the Survey on Netizens' Social Consciousness comes from the national continuous survey project *China Netizens' Social Consciousness Survey*, which has been implemented from 2012 to the present. The 2022 survey adopted a mixed online and offline model: online paid sampling was conducted through the professional research platform "Wenjuan.com", and free sampling was carried out through social media channels. Professor Ma's research team adopted a dual quality control mechanism: 531 invalid questionnaires were immediately eliminated during the collection stage, and 4,215 basic samples were formed after manual review in the later stage. This paper further implements data cleaning. First, samples of adolescents under 18 years old (with poor cognitive stability) are deleted; second, samples with missing values in key variables are excluded; third, samples that cannot be matched with digital government evaluation data are removed. Finally, 1,477 adult samples with analytical value are obtained.

The *2022 China Digital Government Development Index Report* is one of the annual series of *China Digital Government Development Index Report* by the Data Governance Research Center of Tsinghua University. The report was launched by the research team in December 2022, and went

through the links of indicator system optimization, data collection and cleaning, multiple rounds of data comparison, index score calculation, in-depth case research and expert seminars. The system integrates the five major system frameworks of digital government and the five major attribute strategic elements specified in the *Guiding Opinions on Strengthening Digital Government Construction*, reflecting that the digital government development evaluation index system of data governance includes four first-level indicators: organizational structure, institutional system, governance capacity and governance effect.

2.3. Explanation of the measurement of main variables

In the research design adopted in this paper, a phased discussion method is used, resulting in five groups of variables: core explained variables, mediating explained variables, core explanatory variables, factor control variables and individual control variables.

2.3.1. Core explained variable of this paper

The core explained variable of this paper is satisfaction with current work, life and study (Q4). This variable is measured by a 5-level Likert scale (1-5), with the corresponding relationship of values: 1=very dissatisfied, 2=relatively dissatisfied, 3=average, 4=relatively satisfied, 5=very satisfied. It directly reflects the public's overall perception of current social life, and the higher the measured value, the more significant the positive tendency of individual "sense of gain".

2.3.2. Mediating explained variables of this paper

The mediating explained variable system selected in this paper includes two dimensions: individual cognitive evaluation and systemic trust. The measurement methods and theoretical significance of each variable are as follows:

(1) Basic Cognitive Evaluation Dimension

In terms of perception of institutional operation: evaluation of subjective rule of law level (Q23_1), measured by the question "Overall, what level do you think China's current rule of law is at?", using a 0 (no rule of law at all) – 10 (fully ruled by law) continuous scale to assess the public's perception of the phased achievements of rule of law construction. Evaluation of subjective market economy level (Q25_1), measured by the question "Overall, what level do you think China's current market economy is at?" using a 0 (non-market economy) – 10 (complete market economy) scale, reflecting the public's recognition index of the degree of market mechanism construction.

In terms of social value judgment: evaluation of subjective social fairness (Q27_1), based on the question "Overall, what level do you think China's current social fairness is at?" using a 0 (completely unfair) – 10 (completely fair) scale to examine the experiential evaluation of distributive justice by social members. Evaluation of subjective relative democracy (Q30_R2), constructing a binary 10-level evaluation variable by forced choice between "American democracy/Chinese democracy" to measure the micro-representation of group-based institutional confidence.

(2) Development and Trust Dimension

In terms of diachronic development evaluation: subjective perception of 10-year development (Q31), constructing a 3-level measurement indicator of political sense of gain (1=worse; 2=about the same; 3=better) from the longitudinal comparative perspective of "Compared with 10 years ago, has China's political development become better or worse?". Comprehensive index of trust in social

governance institutions (Q52), generating a composite index by arithmetic mean method based on 5-level trust (Likert 1-5) scores of six types of institutions: "central government/district and county governments/public security organs/courts/hospitals/neighborhood committees (village committees)", reflecting the legitimacy foundation of grassroots governance.

In terms of field satisfaction indicators: satisfaction with subjective economic development (Q53) and satisfaction with subjective political development (Q54). The 5-level Likert scales of "satisfaction with national economic development status" and "satisfaction with political development status" are used respectively to depict the specific attitude map of the public in key fields.

2.3.3. Core explanatory variable of this paper

The calculation formula of residual benefit of digital government construction (Q70_RC) can be expressed as: $Q70_RC = (a_1 \times \text{digital government effectiveness index} / \text{digital government input index}) - (\delta \times \text{digital government effectiveness index} / \text{digital government input index})$

The core explanatory variable indicators of this study are constructed based on the *2022 China Digital Government Development Index Report*. First, the digital government input index: the comprehensive value of provincial organizational structure score and provincial institutional system score is adopted, which can effectively reflect the institutional guarantee and financial investment of the government organizational system in digital government construction. Second, the digital government effectiveness index: calculated by integrating provincial governance capacity score and provincial governance effect score, which can systematically characterize the output efficiency of digital government construction. Third, the establishment of benefit ratio: the effectiveness index is divided by the input index, and the resulting ratio is the benefit output per unit input. Fourth, the calculation of residual benefit: the residual benefit parameter Q70_RC formed by subtracting the average group benefit value from the individual sample benefit value is used as the core measurement index to evaluate the effect of regional digital government construction.

2.3.4. Basic individual control variables of this paper

Based on the data, this paper selects age (Q1), gender (Q55), education level (Q57), income (Q58) and occupation (Q59) as basic individual control variables.

Table 1. Descriptive statistics of variables

Variable Name	Mean	Sigma	Min	Max	Variable Description	n
Core Explained Variable						
Satisfaction with current work, life and study (Q4)	3.76	1.01	1	5	Very dissatisfied=1; Relatively dissatisfied=2; Average=3; Relatively satisfied=4; Very satisfied=5	1477
Core Explanatory Variable						
Residual benefit of digital government construction (Q70_RC)	0.21 ⁻¹³	0.18	-0.37	0.97	Q70_R1=Q701+Q702 (Digital government input index); Q70_R2=Q703+Q704 (Digital government effectiveness index); Q70_R3=R2/R1; Q70_RC=R3- δ R3	1477
Mediating Explained Variables						
Evaluation of subjective rule of law level (Q23_1)	7.78	2.01	0	10	Direct scoring by respondents	1477

Table 1. (continued)

Evaluation of subjective market economy level (Q25_1)	7.89	1.81	0	10	Direct scoring by respondents	1477
Evaluation of subjective social fairness (Q27_1)	7.37	2.17	0	10	Direct scoring by respondents	1477
Evaluation of subjective democracy level (Q30_R2)	7.65	2.24	0	10	Direct scoring by respondents	1477
Evaluation of subjective perception of 10-year development (Q31)	3.97	1.16	1	5	Much worse=1; A little worse=2; Don't know=3; A little better=4; Much better=5	1477
Comprehensive index of trust in social governance institutions (Q52)	3.94	0.80	1	5	(Q52_R3+Q52_R4+Q52_R5+Q52_R6+Q52_R7+Q52_R8)/6	1477
Evaluation of satisfaction with subjective economic development (Q53)	4.16	1.02	1	5	Very dissatisfied=1; Relatively dissatisfied=2; Don't know=3; Relatively satisfied=4; Very satisfied=5	1477
Evaluation of satisfaction with subjective political development (Q54)	4.10	1.13	1	5	Very dissatisfied=1; Relatively dissatisfied=2; Don't know=3; Relatively satisfied=4; Very satisfied=5	1477
Basic Individual Control Variables						
Age (Q1)	3.91	2.50	1	9	18-24 years old=1; 25-29 years old=2; 30-34 years old=3; 35-39 years old=4; 40-44 years old=5; 45-49 years old=6; 50-54 years old=7; 55-59 years old=8; 60 years old and above=9	1477
Gender (Q55)	0.64	1.22	0	1	Female=0; Male=1	1477
Education level (Q57)	14.99	2.41	6	19	Assigned by years of education: Primary school and below=6; Junior high school=9; Senior high school/Technical secondary school/Vocational school=12; Junior college=15; Undergraduate=16; Master's and Doctoral=19	1477
Income (Q58)	3.49	1.74	1	9	Below 20,000 yuan=1; 20,000-49,900 yuan=2; 50,000-99,900 yuan=3; 100,000-149,900 yuan=4; 150,000-199,900 yuan=5; 200,000-399,900 yuan=6; 400,000-599,900 yuan=7; 600,000-999,900 yuan=8; 1 million yuan and above=9	1477
Occupation (Q59)	2.98	1.35	1	5	Standardized according to the closeness of connection with government production: Party, government, military and education=5; Private enterprise owners, middle and senior managers, self-employed (operators)=4; Other workers=3; Enterprise staff, workers, agriculture, forestry, animal husbandry and fishery (laborers)=2; Students=2; Unemployed=1	1477

2.3.5. Ideological and media use factor control variables

Factor analysis is used to reduce the dimension of the control variable group. The Bartlett sphericity test result is significant (p -value=0.000), and the KMO value reaches 0.928, indicating that the data is suitable for factor analysis. After maximum variance orthogonal rotation, four core common factors are extracted from the individual social, political and economic views and media use variable groups, and the specific analysis is as follows:

(1) Institutional Identity Factor (F1): The factor loadings focus on measurement indicators such as the credibility of China's official media, the superiority of the state-owned economic system, patriotic values, and recognition of the national rule of law system, reflecting the public's comprehensive attitude towards the national institutional system, and can be used as the core measurement dimension of national institutional identity.

(2) Traditional Media Use Factor (F2): It mainly reflects the frequency and dependence of the audience on traditional official media such as TV, radio and newspapers, covering the traditional media contact characteristics of information acquisition channels, and can be used as a comprehensive evaluation index of traditional media use intensity.

(3) New Media Contact Factor (F3): It centrally reflects the behavioral characteristics of obtaining information through non-official online channels such as social media and self-media platforms. All its constituent indicators are significantly different from traditional media forms, and can be used as a comprehensive observation index of audience new media use and non-official information contact.

(4) Political Participation Tendency Factor (F9): This factor mainly characterizes the individual's attention and willingness to participate in social, political and economic issues, with specific loadings on measurement items such as policy understanding and public affairs discussion frequency, and is suitable as a comprehensive index to measure the public's willingness to participate in politics.

Table 2. Measurement, reliability and validity test of individual social, political and economic views and media use control variables

Factor	Measurement Item	Factor Loading	PCA	KMO	Bartlett (p-value)	Cronbach's Alpha Reliability Test
	Q8_R14 China's official news media	0.5795				
	Q14_R5 Fields related to national security and other important people's livelihood must be fully controlled by state-owned enterprises;	0.3776				
	Q15_R1 I am proud to be Chinese	0.8644				
	Q15_R2 I am proud of China's long history and culture	0.8359				
F1	Q15_R3 I always feel solemn when raising the national flag and playing the national anthem	0.8616	0.5625	0.886	0.000	0.8550
	Q15_R7 In our country, patriotism means loving the Party and the government;	0.7149				

Table 2. (continued)

	Q21_R5 The rule of law means that the Communist Party of China formulates laws, and all individuals and institutions must abide by the laws and act in accordance with the law	0.3448				
	Q6_R3 Domestic portal websites	0.6530				
	Q6_R4 Domestic printed newspapers and magazines	0.6362				
	Q6_R5 Domestic TV stations and radio stations and their Weibo, WeChat accounts	0.6111				
	Q6_R6 Various messages forwarded in WeChat Moments, WeChat groups, and articles on WeChat Official Accounts	0.5934				
F2	Q6_R7 Information released by Sina Weibo accounts	0.6716	0.5864	0.888	0.000	0.8594
	Q6_R8 Western media and their websites	0.4683				
	Q6_R9 Mobile news client APPs	0.6544				
	Q6_R10 Professional online forums	0.6896				
	Q6_R11 Video websites	0.4345				
	Q6_R13 Overseas and Hong Kong and Taiwan Chinese media	0.5355				
	Q6_R8 Western media and their websites	0.4701				
	Q6_R13 Overseas and Hong Kong and Taiwan Chinese media	0.4375				
F3	Q8_R15 Weibo, Douyin non-governmental organizations and personal accounts, WeChat Official Accounts opened by non-governmental organizations and individuals	0.6421	0.5383	0.821	0.000	0.8256
	Q8_R16 Formal foreign news media institutions	0.7665				
	Q8_R17 Foreign self-media	0.8133				

Table 2. (continued)

	Q8_R18 Foreign Chinese websites	0.7929				
	Q2 Generally speaking, are you interested in political news?	0.7835				
F9	Q3 How much time do you spend browsing current affairs and political news?	0.7227	0.6834	0.685	0.000	0.7675
	Q5 How well do you think you understand the current domestic and international political and economic situation?	0.6764				

3. Empirical results and analysis of causal relationship

3.1. Model design

The data sample used in this paper meets the relaxed linear regression requirements, and a mixed linear model is selected to estimate the impact of residual benefits of digital government construction on the public's satisfaction with life. The model is as follows:

Mixed Model:

$$Y_{ij} = \gamma_{00} + \gamma_{01} \cdot Q70_{RC} + \mu_{1j} \cdot x_{ij} + \gamma_{02} \cdot Z_j + \lambda_{ij} + \mu_{0j}. \quad (1)$$

Where Y_{ij} represents the public's satisfaction with life. $Q70_{RC}$ is the spillover of residual benefits of provincial digital government construction. χ_{ij} is the individual-level control variables, including gender, age, education level and income. Z_j is the control variables at the level of individual political and economic views, including evaluation of satisfaction with subjective economic development, evaluation of satisfaction with subjective political development, political interest tendency (and other specific views). λ_{ij} and μ_{0j} are random error terms.

3.2. Linear model regression of core explanatory variables

3.2.1. Main effect analysis

This part analyzes the main effect of digital government construction benefits on the public's sense of gain, that is, analyzes the impact of residual benefits of digital government construction on satisfaction with work, life and study, evaluation of subjective rule of law level, evaluation of subjective market economy level, evaluation of subjective social fairness, evaluation of subjective democracy level, evaluation of subjective perception of 10-year development, comprehensive evaluation of trust in social governance institutions, subjective economic development satisfaction index and subjective political development satisfaction index respectively while controlling the basic individual variables of the sample. From the analysis results (see Table 3), the residual benefits of digital government construction have a negative effect on the public's sense of gain in the nine models, making the public's satisfaction with work, study and life (Model 1), evaluation of subjective social fairness (Model 4), evaluation of subjective perception of 10-year development (Model 6) and comprehensive evaluation of trust in social governance institutions (Model 7) show a

downward trend in digital government construction, and the core explanatory variable (Q70_RC residual benefits of digital government construction) has the most significant impact on the public's sense of gain.

Table 3. Main effect regression results

α	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Q70_RC	-0.401*** (0.147)	-0.385 (0.290)	-0.403 (0.264)	-0.599* (0.313)	-0.283 (0.321)	-0.324* (0.170)	-0.263** (0.118)	-0.257 (0.166)	-0.152 (0.150)
Constant	2.816*** (0.177)	9.518*** (0.349)	9.053*** (0.318)	9.108*** (0.378)	9.475*** (0.387)	3.935*** (0.205)	3.458*** (0.142)	3.916*** (0.200)	4.289*** (0.182)

Note: ***, **, * represent significance levels of 1%, 5% and 10% respectively, the same below.

3.2.2. Robustness test

This paper mainly tests the robustness of the empirical results of the main effect by deleting extreme values in the regression sample and changing the measurement indicators of digital government construction. (1) Eliminate samples with negative residual benefits: in view of the lag of external effects of digital government construction in late-developing regions, retain samples of early-developing regions (accounting for 75.3%) for re-test; (2) Exclude samples with extreme political tendencies: filter outliers at both ends of the political spectrum by 5% (identification criteria: data rated as extremely left/extremely right in the political attitude self-assessment scale) to control the interference of political depression on measurement reliability; (3) Remove heterogeneous high-income samples: truncate special groups with annual income > 1 million yuan to eliminate the confounding effect of wealth effect on the measurement of political and economic attitudes; (4) Control regional heterogeneity: delete samples of Beijing and Shanghai to control the interference of the complexity of mega-city governance and exclude the external validity threat of special regional situations; (5) Variable substitution method: replace the core variable Q70_RC (residual benefits of digital government construction) with Q70_R3 (comprehensive benefits of digital government construction), reconstruct the measurement index system and re-estimate the model parameters.

Table 4. Robustness test results

	(1)	(2)	(3)	(4)	(5)	对比
Satisfaction with current work, life and study	-0.707** * (0.303)	-0.348* * (0.151)	-0.353* * (0.146)	-0.311* * (0.153)	-0.401** * (0.147)	-0.389** * (0.146)
Evaluation of subjective rule of law level	-1.294** (0.597)	-0.221 (0.302)	-0.328 (0.285)	0.0434 (0.293)	-0.385 (0.290)	-0.319** * (0.136)
Evaluation of subjective market economy level	-1.201** (0.542)	-0.290 (0.275)	-0.380 (0.261)	-0.0269 (0.267)	-0.403 (0.264)	-0.309** (0.137)
Evaluation of subjective social fairness	-0.501 (0.653)	-0.570* (0.327)	-0.589* (0.311)	-0.161 (0.319)	-0.599* (0.313)	-0.291** (0.137)
Evaluation of subjective democracy level	-0.805 (0.645)	-0.0849 (0.335)	-0.260 (0.318)	0.132 (0.327)	-0.284 (0.321)	-0.338** (0.135)
Evaluation of subjective perception of 10-year development	-0.421 (0.347)	-0.234 (0.176)	-0.311* (0.168)	-0.163 (0.175)	-0.324 (0.170)	-0.297** (0.138)

Table 4. (continued)

Comprehensive index of trust in social governance institutions	-0.276 (0.240)	-0.213* (0.123)	-0.254* * (0.116)	-0.142 (0.121)	-0.263** (0.118)	-0.262** (0.133)
Evaluation of satisfaction with subjective economic development	-0.544 (0.335)	-0.142 (0.172)	-0.223 (0.163)	0.0669 (0.169)	-0.152 (0.150)	-0.338** (0.135)
Evaluation of satisfaction with subjective political development	-0.177 (0.305)	-0.112 (0.156)	-0.137 (0.149)	-0.0298 (0.153)	-0.257 (0.166)	-0.308** * (0.135)

The robustness test results show that the significance tests of the core explained variable (satisfaction with current work, life and study) all pass, verifying the robustness of the main effect analysis conclusion. This indicates that the achievements of digital government construction not only directly affect the public's satisfaction with their current work, life and study, but also may have a two-way dynamic mechanism. Based on this finding, under the policy background of continuously promoting digital government construction, special attention should be paid to its potential negative effect on public satisfaction. It is suggested to focus on screening mediating variables and moderating variables with regulatory effects through systematic variable identification research, so as to provide decision-making basis for optimizing the implementation path of digital government construction. In summary, the research conclusions support the establishment of Hypothesis H0 (residual benefits of digital government construction directly improve public life satisfaction) and H2 (the process of digital government construction may reduce public real satisfaction).

3.3. Linear model regression of mediating explained variables

It is determined that the mixed regression model of satisfaction with work, study and life and residual benefits of digital government construction is the "null model" while controlling basic individual variables, and then Models (2) to (9) are set according to different mediating explained variables.

Table 5. Regression results with mediating explained variables added

	Satisfaction with work, study and life									
	VIF	(1) Null Model	(2) Q23_1	(3)Q25_1	(4)Q27_1	(5)Q30_R2	(6) Q31	(7) Q52	(8) Q53	(9) Q54
Mediating Variable Results			0.0186*** (0.0123)	0.192*** (0.0136)	0.170*** (0.0114)	0.175*** (0.110)	0.276*** (0.0213)	0.519*** (0.0294)	0.374*** (0.0235)	0.341*** (0.0213)
Q70_RC	1.01 (0.99)	-0.401*** (0.147)	-0.329*** (0.136)	-0.323** (0.138)	-0.299** (0.137)	-0.351** (0.135)	-0.311** (0.139)	-0.264** (0.133)	-0.344** (0.135)	-0.313** (0.135)
Q1	1.07 (0.94)	0.0588*** (0.0105)	0.0553*** (0.00981)	0.0601*** (0.00989)	0.0587*** (0.00982)	0.0522*** (0.00975)	0.0372*** (0.0101)	0.0478*** (0.00960)	0.0513*** (0.00975)	0.0438*** (0.00997)
Q55	1.01 (0.99)	-0.0769 (0.0538)	-0.00835 (0.0502)	-0.0115 (0.0507)	-0.00778 (0.0503)	-0.0163 (0.0499)	-0.0481 (0.0510)	-0.000141 (0.0491)	-0.0204 (0.0498)	-0.0155 (0.0498)
Q57	1.12 (0.90)	0.0246** (0.0113)	0.0538*** (0.0107)	0.0447*** (0.0107)	0.0527*** (0.0107)	0.0553*** (0.0106)	0.0263** (0.0107)	0.00112 (0.0103)	0.0341*** (0.0105)	0.0265** (0.0104)
Q58	1.25 (0.80)	0.0665*** (0.0165)	0.0558*** (0.0153)	0.0579*** (0.0155)	0.0520*** (0.0154)	0.0628*** (0.0152)	0.0779*** (0.0156)	0.0605*** (0.0150)	0.0564*** (0.0152)	0.0601*** (0.0152)

Table 5. (continued)

Q59	1.19 (0.84)	0.0552*** (0.0208)	0.0191 (0.0195)	0.0229 (0.0197)	0.147 (0.0196)	0.0147 (0.0196)	0.0518*** (0.0197)	0.0430 (0.0189)	0.0324 (0.0193)	0.0374* (0.0192)
_CONS		2.816*** (0.177)	1.048*** (0.202)	1.074*** (0.207)	1.269*** (0.214)	1.162*** (0.194)	1.729*** (0.187)	1.020*** (0.190)	1.213*** (0.192)	1.481*** (0.183)

The adjustment mechanism of public sense of gain in digital government construction presents multi-dimensional characteristics, and the specific empirical results are as follows:

1. Analysis of Models (2) to (5) shows that the improvement of the rule of law level (Model 2) and democratic cognition (Model 5) significantly weakens the negative effect of digital government construction. 1) The construction of the rule of law reduces the negative impact coefficient by 32% (0.401→0.264); 2) Democratic participation cognition reduces the coefficient by 27% (0.401→0.299); 3) The adjustment effect of the highly educated group on digital government is significantly enhanced (Q1 coefficient P-value < 0.001).

2. Models (6) to (7) show that diachronic cognition forms a special adjustment path. 1) Perception of 10-year development significantly reduces the significance level of education level variables (Q1 coefficient decreases by 41%); 2) Perception of social fairness reduces the negative impact coefficient by 22% (0.401→0.311); 3) The improvement of institutional trust shows a direct effect of enhancing the sense of gain.

3. Models (8) to (9) reveal that 1) the significance of income and occupation variables decreases by 58% (Q59-P value 0.037→0.172); 2) Political and economic development cognition presents a universal adjustment effect (Q53 coefficient 0.341, P<0.01); 3) The improvement of public cognitive level is significantly negatively correlated with the negative effect ($r=-0.76$).

The research findings verify Hypothesis H3 and construct a theoretical model of "dual drive – collaborative efficiency enhancement". On the premise of continuously consolidating the economic and rule of law foundation, deepening public democratic participation, strengthening social fairness perception, and thus improving institutional trust level can achieve the mutual benefit and symbiosis of digital government construction and public sense of gain. "Rule of law construction → optimization of market economy → improvement of fairness mechanism → deepening of democratic participation → enhancement of institutional trust → information transparency → cross-class consensus" constitutes a 7-level transmission chain. The promotion path model constructed based on this emphasizes that on the premise of consolidating the economic and rule of law foundation, the collaborative improvement of governance effectiveness and sense of gain can be finally achieved by establishing a multi-dimensional democratic consultation mechanism, expanding public participation in governance channels, and building a transparent information interaction system.

4. Further mechanism discussion

After incorporating individual political and economic views and media use variables into the regression model, it is found that the inhibitory effect of residual benefits of digital government construction on public sense of gain remains significant; moreover, under the condition of controlling mediating variables, the four main factors of social, political and economic views and media use all show a significant positive promoting effect. From the significance of each factor effect, a clear hierarchical structure can be established:

1. Core Driving Factors

(1) National institutional attitude index ($p<0.001$);

(2) Traditional media use comprehensive index ($p < 0.001$).

2. Auxiliary Influencing Factors

(1) New media contact degree index ($p < 0.05$);

(2) Political and economic cognitive level index ($p < 0.05$).

This finding is obviously paradoxical with the classical theory of "relative deprivation caused by media contact" in existing research. The data shows that the sample group generally forms a relative superiority cognition through media use, thereby improving the sense of gain. It is particularly noteworthy that the positive effect of the political and economic cognitive level index presents the characteristics of knowledge spillover, that is, the public's in-depth understanding of the social and economic operation mechanism is significantly positively correlated with the satisfaction of work, study and life ($r = 0.32$).

Table 6. Regression of individual political and economic views and media use variables

		Satisfaction with current work, study and life															
		Q23_1				Q25_1				Q27_1				Q30_R2			
Regression of Each Factor		0.58***	0.215***	0.0947***	0.103***	0.192***	0.224***	0.0906***	0.122***	0.190***	0.213***	0.0858***	0.115***	0.144***	0.211***	0.0904***	0.0951***
		(0.0261)	(0.0240)	(0.0247)	(0.0275)	(0.0252)	(0.0241)	(0.0250)	(0.0274)	(0.0249)	(0.0241)	(0.0249)	(0.0271)	(0.0263)	(0.0238)	(0.0246)	(0.0273)
		F1	F2	F3	F9	F1	F2	F3	F9	F1	F2	F3	F9	F1	F2	F3	F9
Q70_RC		-0.334**	-0.292**	-0.295**	-0.322**	-0.327**	-0.284**	-0.291**	-0.316**	-0.306**	-0.265**	-0.269**	-0.295**	-0.352**	-0.312**	-0.318**	-0.342**
		(0.135)	(0.133)	(0.136)	(0.136)	(0.135)	(0.134)	(0.137)	(0.137)	(0.137)	(0.133)	(0.137)	(0.136)	(0.134)	(0.132)	(0.135)	(0.135)
		F1	F2	F3	F9	F1	F2	F3	F9	F1	F2	F3	F9	F1	F2	F3	F9
Regression of Each Factor		0.154***	0.216***	0.136***	0.156***	0.129***	0.192***	0.0894***	0.0936***	0.156***	0.219***	0.0894***	0.0936***	0.124***	0.204***	0.117***	0.0908***
		(0.0288)	(0.0246)	(0.0249)	(0.0265)	(0.0258)	(0.0237)	(0.0242)	(0.0262)	(0.0257)	(0.0237)	(0.0242)	(0.0264)	(0.0271)	(0.0239)	(0.0243)	(0.0274)
		F1	F2	F3	F9	F1	F2	F3	F9	F1	F2	F3	F9	F1	F2	F3	F9
Q70_RC		-0.327**	-0.278**	-0.258*	-0.302**	-0.276**	-0.237*	-0.233*	-0.262**	-0.345**	-0.303**	-0.306**	-0.332**	-0.321**	-0.279**	-0.269**	-0.308**
		(0.138)	(0.136)	(0.138)	(0.137)	(0.132)	(0.131)	(0.133)	(0.133)	(0.134)	(0.132)	(0.135)	(0.135)	(0.134)	(0.132)	(0.135)	(0.135)
		F1	F2	F3	F9	F1	F2	F3	F9	F1	F2	F3	F9	F1	F2	F3	F9

The study finds that the impact of media use on governance evaluation presents structural heterogeneity. In the models of subjective rule of law level, market economy level and economic development evaluation, media use shows strong explanatory power, revealing that the transformation path from the public's economic/rule of law satisfaction to sense of gain is relatively smooth; in contrast, its explanatory power in the comprehensive index model of trust in social governance institutions is weak, reflecting the mechanical obstruction of the transmission from governance trust to sense of gain. This gradient effect essentially reflects two modes of administrative power operation—in the economic, social and rule of law fields, administrative power is usually required to maintain moderate restraint; while in conventional governance practice, it presents high-frequency intervention characteristics.

As the core hub of the national governance system, the legal attributes of administrative power (precedence, execution priority, unilateral nature of acts) endow it with a unique kinetic energy

transmission mechanism. Studies have shown that this mechanism exhibits institutional effectiveness in scenarios such as conflict mediation (Levine & Moreland, 1998) and social compliance guidance (Shaw, 1981), but implies a "dilemma of effective leadership balance" (Hollander & Fodor, 1985). Multi-dimensional scale measurement reveals that mandatory governance methods will trigger a pedigree of feedback modes (Forsyth, 1990), from short-term behavioral obedience (behavioral level), to medium-term attitude confrontation (Lawler & Thompson, 1978), and finally to long-term role tension (psychological level). Although this tension resonates theoretically with the "power complementarity hypothesis" (Carson, 1969; Gifford & O'Connor, 1987; Kiesler, 1983), excessive reliance on coercive power will trigger the governance dissipation effect (reactance rebound effect).

This paper finds that the referential governance strategy achieves governance efficiency enhancement through dual empowerment channels. Rational persuasion and professional demonstration constitute explicit drivers, stimulating individuals' decision-making participation kinetic energy (Bazerman et al., 1982; 1984); internalization of responsibility ethics (Moon, 2001) and improvement of group identity (Dietz-Uhler, 1996) form implicit traction, strengthening the public's continuous participation commitment (psychological adhesion). This two-wheel drive mechanism effectively connects the transmission chain of "participation input – psychological commitment – governance sense of gain". The empirical analysis of digital government construction reveals a deep institutional paradox: the intelligent expansion of technical governance (depth-expanding) and the institutional contraction of citizen participation (channel-narrowing) form a structural antithesis. The data shows that the lack of intersubjective engagement mechanism leads to the reduction of participation efficacy, resulting in the dissolution of the generation basis of governance sense of gain. Solving this dilemma requires constructing a three-dimensional governance ecology of "subject collaboration – technology empowerment – institutional connection".

5. Conclusion and expandable research

Based on the mixed cross-sectional dataset constructed from part of the data of the *2022 Survey on Netizens' Social Consciousness* and the *2022 China Digital Government Development Index Report*, this paper systematically explores the multi-dimensional impact of residual benefits of digital government construction on public satisfaction with work, study and life from the dual perspectives of political psychology and public law theory. First, the improvement of digital government performance is significantly negatively correlated with the characterization of public sense of gain ($r=-0.401$, $p<0.001$), and the characteristics of administrative power operation may aggravate public participation alienation; second, modern governance elements constitute a buffer mechanism—the level of rule of law, degree of marketization, social fairness index, democratic process and comprehensive development evaluation can effectively hedge the alienation effect of digital governance; finally, the digital reshaping of the governance structure is catalyzing a new model of government-society interaction, and the public's trust index in social governance institutions has become a key mediating variable for the generation of sense of gain.

From the perspectives of political psychology and public law theory, this paper comprehensively analyzes the impact and enlightenment of digital government construction on the public's sense of gain. First, on the basis of continuously attaching importance to market economy development and institutional construction, we should effectively implement the governance strategy and system of "co-construction, co-governance and shared benefits", effectively share the achievements of reform and development with the people, and focus on promoting whole-process people's democracy.

Second, digital government construction has greatly enhanced government governance capacity, but the governance thinking is still dominated by the elite governance logic centered on government and technology. The public perceives that governance institutions such as the government generally distrust mass autonomy, which reduces the public's sense of gain from development and reform. Third, digital government construction has entered a deep-water zone. The extensive method of only relying on investment to improve facilities and systems and the way to rapidly improve government performance are already insufficient, making it difficult for the public to truly feel and share the achievements of social, political and economic development. Therefore, while continuing to promote digital government construction, we should let the public participate in the social, political and economic governance related to their own development interests, and realize the qualitative change from "efficiency improvement" to "sense of gain transformation".

In addition, this paper also has directions for further exploration. At the methodological level, limited by the time-point characteristics of cross-sectional data (single year of 2022), although individual heterogeneity is controlled through hierarchical linear model (HLM), panel data is still needed to verify the time-varying effect of the conclusion; at the index construction dimension, the composite measurement of work and life satisfaction may weaken the accurate identification of the impact of digital government construction, and the difference-in-differences (DID) method can be used to set up policy experimental groups in the future; from the perspective of model technology, the mixed OLS model has limited effectiveness in dealing with spatial heterogeneity, and it is recommended to introduce geographically weighted regression (GWR) to optimize parameter estimation; in terms of theoretical depth, the dialectical relationship between "technology empowerment" and "right contraction" in digital governance has not been fully deconstructed, and interdisciplinary expansion needs to be carried out by integrating information ethics theory.

References

- [1] Wang, Y. (2022). Justification and realization path of the right to refuse fully automated decision-making: Centering on Article 24, Paragraph 3 of the Personal Information Protection Law. *The Jurist*, 5, 72-86+193.
- [2] Sun, Z. F., & Qin, R. N. (2024). Theoretical basis, hot issues and development trends of digital government construction. *Journal of Xi'an Jiaotong University (Social Sciences)*, 1, 42-51.
- [3] Lü, P. A. (2024). Policy evolution of China's digital government construction and development: Characteristics, trends and laws—A quantitative analysis of policy texts. *Library Theory and Practice*, 6, 95-105+136.
- [4] Yu, W. C., & Wang, D. (2024). Can digital government construction reduce corporate unproductive expenditure? Empirical evidence from Chinese listed companies. *Journal of Finance and Economics*, 1, 124-138.
- [5] Zhu, C. Y., & Nan, R. (2024). Test on the impact of digital government construction on regional innovation level. *Statistics & Decision*, 1, 168-173.
- [6] Li, M. Y., & Zhang, N. L. (2024). Digital government construction and enterprises' outward foreign direct investment: Empirical evidence from Guomai E-Government Network. *International Economics and Trade Research*, 3, 56-74.
- [7] Li, W. Z. (2021). Interface government theory: A new perspective to understand China's government reform in the internet era. *Journal of Renmin University of China*, 4, 11-18.
- [8] Zhao, Y. L., Ren, Y., & Zhou, Y. (2020). Formalism at fingertips: Grassroots digital governance under pressure-based system—An empirical analysis based on 30 cases. *E-Government*, 3, 100-109.
- [9] Kong, W. H., Wu, J. Y., & Huang, S. Y. (2021). Digital divide and relative deprivation: Microscopic evidence and influence mechanism. *E-Government*, 1, 110-124.
- [10] Lü, X. K., & Huang, Y. (2018). How to measure sense of gain? Taking data from Chinese General Social Survey (CGSS) as an example. *Journal of Northwest Normal University (Social Sciences)*, 5, 46-52.
- [11] Chen, D. Y. (2021). Digital sense of gain: Youth development based on digital competence and digital usage. *China Youth Study*, 8, 50-57.
- [12] Ji, C. Y. (2021). Redistribution reform and sense of gain: Taking the reform of exempting agricultural tax as an example. *Comparison of Economic and Social Systems*, 5, 29-40.

- [13] Wen, H., & Lin, B. (2021). People's sense of gain: Mechanism explanation between expectation of a better life and national economic performance—Time series comparative analysis of subjective and objective data. *Academic Research*, 1, 66-73.
- [14] Yang, B., & Li, W. L. (2022). Sense of gain effect of public services: Empirical research on logical structure and release path. *Chinese Public Administration*, 10, 135-143.
- [15] Ye, X., Xie, C., & Mao, Z. G. (2018). Measurement and difference analysis of Chinese residents' livelihood sense of gain and livelihood satisfaction. *The Journal of Quantitative & Technical Economics*, 10, 3-20.
- [16] Xu, Y. H., & Li, Z. B. (2021). Social quality and sense of gain of urban residents. *Nankai Journal (Philosophy, Literature and Social Science Edition)*, 4, 169-181.
- [17] Tang, F., & Su, Y. S. (2022). "Internal and external differences": How does political participation affect the public's sense of gain? *Public Administration Review*, 2, 22-41.
- [18] Du, Y. B. (2024). Research on the influence mechanism of digital government construction on public digital sense of gain from the perspective of supply-demand interaction. *Public Administration and Policy Review*, 5, 46-61.
- [19] Zheng, J. J. (2020). Measurement and current situation of Chinese citizens' perception of a better life: Also on the relationship among sense of gain, sense of security and sense of happiness. *Cass Journal of Political Science*, 6, 89-103.
- [20] Smith, H. J., Pettigrew, T. F., Pippin, G. M., et al. (2012). Relative deprivation: A theoretical and meta-analytic review. *Personality and Social Psychology Review*, 16(3), 203-232.
- [21] Jing, X. X. (2013). Challenges and reforms: From grid management to grid governance—Based on the reform of urban grassroots social management. *Theoretical Exploration*, 1, 102-105.
- [22] Tian, S. L., & Zheng, C. Y. (2023). Subjectivity crisis of workers in the digital era and social law response. *Journal of Central South University (Social Sciences)*, 5, 79-94.
- [23] Sha, S., Wang, Y. L., & Han, C. M. (2023). Digital civilization construction: Ethical dilemma, optimization path and development prospect of digital governance. *Leadership Science*, 5, 106-109.
- [24] Guan, S. (2022). Governance logic and path selection of digital inequality. *Study & Practice*, 8, 51-59.