Digital Government Era: The Impact of Digital Literacy and Stress Perception on Civil Servants' Job Performance—An Empirical Study of 240 Samples from City Z

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Abstract

Under the background of the vigorous development of digital government, the rapid development of information technology impels governments at all levels to actively promote digital transformation. In this paper, digital government, civil servants' digital literacy, stress perception and work performance are included into an organic theoretical analysis framework. Through the empirical investigation and analysis of 240 civil servants under the digital government environment in Z city, it is found that the digital literacy of civil servants is composed of three dimensions: Digital consciousness, digital ability and digital responsibility. There is a positive correlation between digital literacy and their engagement in digital government development, with digital ability playing a particularly crucial role. Stress perception is an important positive predictor of civil servant job performance, but its mediating effect between digital literacy and job performance is not significant. It is recommended that government departments establish a diversified digital literacy cultivation system to enhance civil servants' digital capabilities, optimize work processes, and implement stress management mechanisms while fostering a healthy work culture.

Keywords

Digital Literacy, Stress Perception, Job Performance, Digital Government, Civil Servants

Introduction

In today's society, information technology is flourishing exponentially, and the construction of digital government is surging. The report of the 20th National Congress of the Communist Party stresses that "it is necessary to speedup the construction of a powerful network country and digital China, and further promote the construction of a digital government," which is an inevitable requirement for meeting the trend of the information age and speeding up the construction of a digital China, as well as an important measure for promoting the modernization of the national governance system and the governance capacity. Government departments at all levels actively take the digital express, and deeply integrate government affairs resources, a series of advanced digital office systems are widely embedded into the administrative process, and government affairs services can break through time and space limitations, and reach the public efficiently .(戴长征 & 鲍静, 2017)However, amid this rapid advancement, real challenges are gradually emerging. As the microcosmic constitution of government organization, every link of digital government construction can not be separated from the deep intervention of civil servants, including the factors of organization and technology emphasized by the academic circles, which need to be deeply coupled

with civil servants to generate the governance transformation effect (翟云 , 2022) of digital government. However, there are significant individual differences in digital literacy levels. Some personnel struggle with emerging digital technologies such as big data analysis and AI-assisted decision-making, frequently encountering difficulties like unfamiliarity with technical operations and misinterpretation of data. These challenges severely hinder the smooth operation of government processes and the advancement of service efficiency.(刘芳 & 吕鹏, 2024) At the same time, the acceleration of digital transformation not only brings information explosive growth(谢小芹等, 2025) and the urgent compression of the time limit for task handling(Wu lei, Zhou) but also makes the people's expectation of the quality of government affairs service rise .(康健等, 2024) Under the multiple pressure interweaving, the stress perception of civil servants rises sharply, the risk of job burnout emerges, and the hidden danger is laid for the orderly development of daily public service.

Focusing on the frontier of academic research, the previous exploration of digital government focuses on macro-structure construction, top-level policy design and other grand narrative categories. First, the existing research identifies many variables that affect digital government construction, including infrastructure (阮霁阳, 2022), organizational system (张鸣, 2020), and public demand (赵岩等, 2021), with a focus on technological, organizational, and environmental factors. Secondly, as far as digital literacy research is concerned, although a small amount of theoretical research begins to explore the concept, value(郭高晶等, 2024) and factor model(张红春 & 杨欢, 2022) of civil servants'digital literacy, most of them are confined to the discussion of their theoretical traceability and universal cultivation path within the educational discipline. Finally, research in the field of perceived stress also shows a similar trend, with psychological health(李润欣等, 2023) and employee effectiveness(王娜, 2021) having long dominated the focus of studies. However, the unique stress triggers, alleviation pathways, and deep impact on government work practices for civil servants in the context of digital government have not been precisely mapped out by scholars. The complex mechanisms of how multiple factors interact to affect civil servants'work performance across various dimensions remain unclear. Clarifying how civil servants' digital literacy influences their work performance and, in turn, their willingness and actions to advance digital government construction is crucial for understanding the micro-driven logic behind the development of digital government.

In view of this, according to the survey data of 240 civil servants in Z city, using structural equation model to anchor the background of digital government era, taking digital literacy as independent variable, stress perception as intermediary variable, work performance as dependent variable, this paper explores: In the context of the dynamic development of digital government, what key elements are the structure of civil servants' digital literacy, and how do these elements combine together to effectively drive the improvement of work performance? Introduce stress perception as a mediating variable to explore which key role to play in the performance process of digital literacy enabling work, as a negative adjustment variable that buffers barriers, as a positive boost variable that catalyzes synergies, or as a complex hub that triggers nonlinear effects. The systematic exploration of the above problems can not only make up for the digital government theory building, fill in the microcosmic behavior research of civil servants, but also accurately

anchor the training target of civil servants in the practice field, optimize the growth track of public sector organization and management, help the government departments to carve out the detailed human resources management strategy, and boost the digital government to the new journey of high-quality development.

Literature Review and Research Hypothesis

Literature Review

In the area of academic research, academic circles have sprang up the research of digital literacy. In the early stage Gilster focusing on the carving of basic concepts(Gilster, P., 1997), the following scholars started from the purely digital skill operation cognition(黄如花 & 赖彤, 2024), gradually expanded the boundary, integrated the information discrimination(张红春 & 杨欢, 2023), digital ethics(孟天广, 2021) and other multiple elements, and set up a stable frame of connotation interpretation. From a conceptual perspective, civil servants'digital literacy is the comprehensive of the civil servants' qualities and abilities in order to be competent for the task of digital government administration and governance. In terms of content, digital literacy includes digital psychology(袁红 & 黄庆庆, 2025), digital cognition(刘彧晗 & 喻国明, 2024), digital skill(刘忠轶等, 2024) and so on. These components can be explained using the "iceberg model" of literacy, which posits that digital literacy consists of both explicit and implicit levels. Digital skills literacy is the explicit part of digital literacy, representing the digital operational abilities required to solve practical problems in a digital environment. On the other hand, digital cognition and psychological literacy form the implicit part of digital literacy, consisting of deeper internal qualities such as digital emotions, digital attitudes, and other aspects, reflecting an individual's understanding, attitude, and feelings toward digital objects.

The same is true for stress perception. At the beginning, the research is focused on the accurate screening of stressors, and the high-intensity task load(肖维等, 2022), complex interpersonal entanglement(何应晓, 2022), and role conflict frequency(李菁林等,2023) in the workplace are locked as the key triggering factor, pave the foundation stone for subsequent expansion. Then it extends to the exploration of coping strategies, and the multiple paths such as individual psychological adjustment and organization support system are emerging. At the organizational level, resource tilting and process optimization can effectively reduce pressure shock (陈钰瑶等, 2024); At the individual level, strengthening mental resilience becomes the key to coping(赵云辉等, 2021). But in the new context of digital government, civil servants'unique stress perception triggered by digital tide, such as the fierce impact of information flood, the anxiety caused by technical iteration, the invisible pressure caused by public supervision, and the infiltration track of these pressures in various links of work flow, are still in the bud stage of current research.

The performance of civil servants is "the quantity, quality, efficiency, economic benefit, social benefit and related value of the work completed by civil servants"(樊骅等, 2015). Under the traditional model, the multi-dimensional performance evaluation system can be shaped by relying on the hard scale such as task completion efficiency and achievement degree of established objectives. (萧鸣政 & 张满, 2014)Factors such as the influence of organizational culture, the

leadership style, and the driving force of individual motivation, etc. However, in the context of the digital government transformation, there is a significant lack of research that comprehensively considers civil servants' digital literacy and perceived stress, and further analyzes the complex and dynamic influence mechanisms of these factors on performance. This gap in research has prevented a thorough understanding of the internal logic of how micro-level individual factors can drive the improvement of macro-level government effectiveness.

Research Hypothesis

Digital awareness is the recognition and sensitivity of civil servants to digital technology and its application value under the background of digital era, which lays a foundation for improving work performance. On the one hand, civil servants with high digital awareness can seize the development trend and opportunities of digital technology, accept new work mode and process with open mind, and quickly adapt to the pace of digital transformation of government affairs.(孟天广, 2021) In their daily work, they actively follow emerging technology applications such as big data analytics and cloud computing, proactively learning from best practices. By integrating these cutting-edge concepts into local digital government planning, they lay a solid foundation for the scientific and targeted formulation of future policies. This ensures that policies are practical from the outset, reducing blind spots and ultimately enhancing work performance. On the other hand, digital awareness makes it easier for civil servants to understand the importance and urgency of digital government construction, so as to actively explore the potential value of government affairs data(王张华 & 张思睿, 2022).They are good at extracting key information from massive data, quickly identifying the digital links that can be optimized in the government affairs process, providing data support for accurate governance, improving the pertinence and effectiveness of government affairs services, promoting the transformation of office mode to efficient and convenient mode, and really injecting power for improving the overall work performance, so they put forward the following assumptions:

H1: Digital awareness has a significant positive effect on improving civil servants'performance.

The internal relationship between digital ability and civil servants' performance is deeply explored. Digital ability covers the practical ability of civil servants to handle government affairs and solve problems efficiently with digital tools. In the field of government practice, the digital ability directly determines whether the civil servants can perform their duties efficiently(范逢春 & 邓炜, 2024). Civil servants with excellent digital ability can quickly input and accurately analyze various types of government affairs data and greatly improve the efficiency of daily affairs. In the implementation of the people's livelihood policy, they use professional digital tools to accurately screen the support objects, track the policy effect feedback in realtime, optimize the service process, adjust the optimization implementation strategy in time, and ensure that the policy does not go away. At the same time, digital capability helps civil servants to build a digital communication bridge across departments. In joint law enforcement, collaborative services and other projects, relying on digital cooperation platform to realize real-time information sharing and seamless task integration, reduce communication costs, optimize workflow, and comprehensively empowering the enhancement of work performance(温志强 & 李永俊, 2022). Finally, the strong digital ability

makes civil servants more competent when facing the complex task of digital government construction, and can give full play to the advantages of digital technology. Thus, the following assumptions are put forward:

H2: Digital ability has a significant positive effect on improving civil servants'performance.

Digital responsibility is the responsibility and obligation of civil servants in data security, information privacy protection and digital ethics. To explore the link between digital responsibility and civil servants' promotion of digital government construction, the digital responsibility shouldered by civil servants is the external guarantee for the steady operation of digital government(丁梦兰, 2020) . In the era of digital government, data has become a critical asset, with its security and accuracy being of utmost importance. Civil servants with strong digital responsibility place greater emphasis on compliance and security in digital government development. They strictly adhere to relevant laws, regulations, and ethical standards, meticulously handling data entry, storage, and transmission processes. By rigorously following data management protocols, they minimize risks of data breaches and tampering, ensuring precision and accuracy in their work. Moreover, when advancing digital governance transparency and managing interactive platforms, they strictly abide by the bottom line of digital ethics, guarantee the people's right to know and the right to participate(张杰 & 李玉波, 2023) . By actively responding to societal concerns, they foster a healthy digital governance ecosystem, creating a favorable environment for policy implementation and service delivery. This reduces work resistance, facilitates smooth operations, and directly contributes to improving work performance. Therefore, the following assumptions are proposed:

H3: Digital responsibility has a significant positive effect on improving the performance of civil servants.

Focusing on work performance, stress perception also plays a subtle role. When the stress perception of civil servants is in a reasonable range, they can transform the pressure into a driving force, exploit the advantages of digital literacy more actively in their work, analyze problems accurately with the help of digital technology, work with the team to solve difficult problems, and then improve the work performance (李开磊, 2017). For instance, when handling unexpected public emergencies, civil servants with strong digital literacy can respond swiftly, ensuring that government services remain uninterrupted and operate efficiently under pressure. On the other hand, too much pressure will lead to distraction and decision-making errors, which makes it difficult to give full play to the original digital literacy, resulting in a decline in work efficiency, discounted service quality, and a drag on work performance (郑志龙 & 黄旭, 2021). In conclusion, stress perception plays a strong mediating role between digital literacy and civil servants' performance, and can regulate the energy transfer between them according to their own strength. Accordingly, the following hypothesis is proposed:

H4: stress perception plays a mediating role in digital literacy and civil servants'performance.

Research Design

Research Methods

Under the overall research framework of this study, data is primarily collected through questionnaire surveys, participatory observation, and semi-structured interviews.

Questionnaire survey method. Questionnaire is a common data collection method that allows researchers to collect data from a large number of respondents through standardized questions. In this study, questionnaire design followed the following steps: Questionnaire design: According to the research purpose, a series of questions were designed to measure the three dimensions of digital literacy (consciousness, ability, responsibility), stress perception and civil service performance. Prediction test: The prediction test shall be carried out before the formal release to check the understanding and answer of the questionnaire, so as to ensure the clear description of the questions and avoid ambiguity. Data collection: Through participatory observation, interviews, and meeting participation, combined with a non-probability sampling method using accidental sampling, questionnaires were distributed, and data was collected from 22 departments within the Z City government building. Sample representativeness: Ensure that the sample can represent the population of the study, and improve the data generality and representativeness through the principle of random purposeful sampling. Data Processing: The collected questionnaire data underwent cleaning and coding to facilitate subsequent statistical analysis.

Participatory Observation. Participatory observation refers to the direct observation of the researchers in the background of the life of the research object and in the process of the daily social life of the research object, which can minimize the influence of the researchers' perspectives and opinions on the research object and better obtain the real image of social reality. From July to August 2024, the author interned at Department N of the Z City government building, engaging as a participant in relevant government reform documents and immersing in civil service work settings. Through detailed observation and documentation, the study examines the roles undertaken by civil servants, their dynamic feedback, and their work performance throughout the digital government development process.

Semi-structured Interview Method. The semi-structured interview method refers to interviewers asking respondents relevant questions orally based on research needs, collecting objective factual information through their responses. The interview subjects of this study mainly include the following three categories: ①Civil servants from various departments under the Z City government. By interviewing officials across different levels, the study systematically explores the details of digital government development, work processes, sense of accomplishment, and stress adaptation. ②Civil servants from non-local units handling interdepartmental tasks. These interviews examine how officials with different levels of digital literacy approach their work, focusing on their efficiency and attitudes toward task execution. ③Citizens handling government affairs. In-depth interviews with these individuals provide insights into their perceptions of service efficiency and the convenience brought by digital transformation, helping to assess civil servants' work performance and further enhance the depth and accuracy of the research.

Empirical Research Method. Empirical research is a research method that verifies theoretical assumptions by observing actual data. In this study, the empirical research method includes the following steps: Theoretical framework: Constructing a theoretical model in which independent

variables are digital literacy, dependent variables are job performance of civil servants, and stress perception is intermediary; Reliability and validity analysis: Use SPSS software to analyze the reliability of questionnaire data; Correlation analysis: Pearson correlation coefficient is used to analyze the correlation between variables to reveal their relationship strength and direction. Structural equation model analysis: AMOS software is used to analyze the structural equation model, to evaluate the fitting degree of the theoretical model, and to explore the complex causality between variables. Intermediary effect test: The confidence interval of intermediary effect is calculated by self-help method (bootstrap) to test the intermediary effect of stress perception between digital literacy and civil servants' job performance. Results Interpretation: Based on the empirical analysis results, the data were interpreted and the potential impact on civil servants' performance was discussed.

Case Study Method. In the era of digital government, it is very important to promote the performance of civil servants. It is not only the key driving force for the construction of digital government to move from blueprint to reality, but also the core element for ensuring the accuracy and efficiency of government service and the continuous rise of public satisfaction, thus stabilizing the credibility of government and realizing the modernization of digital governance system and governance ability. So, how does civil servants' digital literacy fluctuate stress perception, performance and then affect job performance? In view of the above problems, this paper based on the Kuzel's verification sampling principle, combined with the Z city 2023-2024 new digital government reform practice case analysis.

In recent years, the Z municipal government accurately grasps the pulse of the times, deeply integrating into the surging wave of digital government construction, showcasing distinctive local implementation characteristics. At the infrastructure construction level, on one hand, the focus is on building a government data integration and sharing platform. A cross-departmental task force was established, conducting months of research and analysis to precisely identify the data intersection points between departments. This enables real-time sharing of core data from multiple departments, such as industry and commerce, taxation, and civil affairs, greatly enhancing data flow efficiency. On the other hand, we attach great importance to the construction of network security protection system, actively introduce blockchain encryption technology, enlist network security experts for data transmission and storage encryption, at the same time, setup local professional operation and maintenance team, regularly carry out attack and defense drills, and ensure that the digital government operates without failure.

In the dimension of optimization of government affairs service, Z city government always strives to fight hard. With the purpose of meeting the public's need for convenient services, bold and sweeping reforms have been made to traditional government processes. Aiming at the real estate registration business, the model of "one-net communication office, intelligent audit" is innovatively launched. By using big data comparison and artificial intelligent image recognition technology, the material authenticity and real estate information are automatically checked and verified. After the online submission of materials by the public, the system immediately feeds back the audit results. The time consumed in the whole process is nearly 80% shorter than before. Many similar matters

are efficiently handled online in succession. The public enjoys convenience without going out of the house and greatly saves the cost of handling matters. With this series of solid and innovative measures, Z city government has made every effort to create a convenient, efficient and intelligent digital government environment, injecting constant and powerful power into the development of regional economic soaring and social harmony, taking a solid and powerful and unique step in the construction of digital government, and choosing Z city government as a research case has certain demonstration and typicality.

Theoretical Analysis Framework

This paper designs the theoretical model for the research of civil servants'performance. Based on the theory of digital literacy, this paper discusses how the three dimensions of digital literacy-consciousness, ability and responsibility-affect the stress perception and work performance of civil servants. The model assumes that the improvement of digital literacy can significantly affect the public officials' perception of job strength, and then improve their job performance. In the model, the three dimensions of digital literacy not only directly affect stress perception, but also as a mediating variable, which affects the direct influence of digital literacy on the performance of civil servants. Through empirical analysis, the study supports the positive effect of digital literacy on civil servants'job performance, but the effect of stress perception as a mediating variable is not significant. This discovery provides an important theoretical basis for the construction of digital government. It points out that improving civil servants' digital literacy is an effective way to improve their work performance. At the sametime, it also indicates the stress perception that maybe produced by civil servants in the process of improving work performance. The theoretical analysis framework is as shown in Fig.:

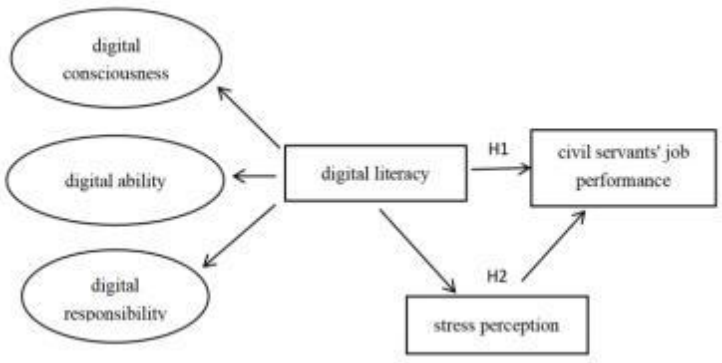

Figure 1 Theoretical Model

Questionnaire Data Collection

Considering the accessibility and representativeness of the investigation samples, during the two-month internship, the author roughly understands the basic relevant information of the Z municipal government through participation observation, visits the working building to interview the public officials of other departments and the citizens handling business on the working day, observes and learns the process and characteristics of their handling work, and receives and attends

the relevant promotion meeting of the government on digital government construction for many times.

On this basis, the author designed the questionnaire and distributed it during the internship period from July to August 2024. With the core office floor as the boundary, the team divided the government building into the upper and lower areas. The survey subjects were roughly the same each time in the afternoon, and there were more civil servants in the departments below the office, so the survey subjects also increased in the same proportion. In order to enhance the richness of the samples, the method of combining stratified sampling with snowball sampling was applied to collect the civil servants' samples of different levels and departments as much as possible, and the corresponding number of copies was allocated according to the positions at different levels and distributed in different time periods to ensure that the data were closer to the true state as much as possible, 250 copies of paper questionnaires were distributed, and 246 copies were actually collected. To ensure data quality, questionnaires with excessively short completion times or uniform responses across multiple consecutive items were excluded, resulting in a final valid sample of 240 questionnaires.

Empirical Analysis of Civil Servants' Job Performance

Individual Characteristics of Participants

In the research of civil servants'performance, it is very important to understand the individual characteristics of civil servants in order to reveal their digital literacy and stress perception.

First, gender and age distribution. Regarding gender, the survey results indicate that male civil servants outnumber female civil servants, accounting for 67.5% and 32.5%, respectively. This suggests a certain degree of gender imbalance in the sample distribution, though it aligns with the existing composition of personnel within the public sector in China. As for age distribution, the sample covers a wide range from 18 to over 60 years old. Notably, middle-aged civil servants aged 41 and above constitute the largest proportion at 52.5%. This demographic segment typically forms the backbone of the civil service system, making their work performance particularly significant.

Second, economic situation and educational background. In terms of economic status, the survey data showed that the average monthly disposable income of participants was mainly concentrated in the range of 2001-7,000 yuan, accounting for 95.26%. The civil servants of this income level occupy a large proportion in the construction of digital government in Z City, which may have some generality to the fluctuation of stress perception and the change of work performance. At the sametime, there are quite a few civil servants with monthly disposable income of more than 10,001 yuan, accounting for 2.08%, which indicates that there are also some senior department leaders in the surveyed civil servants of Z city government, and their stress perception and work performance perception to themselves and their subordinates maybe different from most civil servants. In educational background, the proportion of participants withdiploma or below is the highest, reaching 62.92%, which indicates that the low level of education may have a negative impact on the acceptance and participation of digital transformation.

Table1 Participant assignments

Observation variable name	Meaning	Assignment
X1	Gender	0= female; 1= male
X2	Age	0 =17 and under 1=18-25 years 2=26-30 years old; 3=31-40 years old 4=41 years and over 5=60 years and over
X3	Diploma	1= Specialty and below 2= Undergraduate 3= Master Dr. 4= and above
X4	Your monthly disposable income	0=2000 yuan and below 1=2001-4,000 yuan 2=4001-7,000 yuan 3=7001-10,000 yuan 4=10001-20,000 yuan 5= 20,001 yuan and above

Note: Results are sorted and exported by Spss26.0

Table2 Individual characteristics of participants

Demographic variables	Breakdown entry	Number	Percentage
Gender	Female	78	32.5%
	Male	162	67.5%
Age	17 and under	0	0
	18-25 Age	11	4.6%
	26-30 Age	33	13.75%
	31-40 Age	70	29.17%
	41 and older	126	52.5%
	Over 60	0	0%
	2000 yuan and below	0	0%
	2001-4000 Yuan	143	59.58%

Disposable income	4001-7000 Yuan	85	35.41%
	7001-10000 Yuan	7	2.92%
	10001-20000 Yuan	5	2.08%
	RMB 20001 and above	0	0%
Diploma	Junior college and below	151	62.92%
	Undergraduate	68	28.33%
	Master's degree	18	7.5%
	PhD and above	3	1.25%

Note: Results are sorted and exported by Spss26.0

Reliability and Validity Analysis

Reliability analysis typically involves calculating Cronbach's α, which is an indicator used to measure the internal consistency of a questionnaire. The Cronbach's α value ranges from zero to one, and a larger value indicates a higher reliability of the questionnaire. In general, a Cronbach's α value greater than 0.7 is considered an acceptable level of reliability. According to the reliability analysis data in Table 3, we can evaluate the reliability of each construction (measurement object):

Digital literacy (consciousness). The Cronbach's α value of 0.822 indicates a good internal consistency of the "consciousness" dimension in digital literacy. The Cronbach's α value decreases after deleting any item, indicating that each item contributes positively to the overall reliability. Digital literacy (ability). The Cronbach's α value is 0.941, showing a very high degree of confidence in the Competency dimension. This result indicates that there is good agreement among the items in the questionnaire used to measure the ability of digital literacy. Digital literacy (responsibility). The Cronbach's α value is 0.893, which is also a high confidence value, indicating good internal consistency of the items in the Responsibility dimension. In the aspect of stress perception, Cronbach's α value is 0.891, which indicates that the questionnaire items in the dimension of "stress perception" have very high reliability, and the relationship between the items is close, which can reliably measure the stress perception of civil servants on the improvement of work performance. The Cronbach's α value is 0.858, which is also a high-confidence value, meaning that the "job performance" dimension items can consistently measure the job performance of civil servants.

Taken together, the Cronbach's α values for all dimensions were higher than 0.7, indicating that the questionnaire used had a high degree of reliability in measuring each dimension and that the data were reliable. This provides a solid foundation for the subsequent validity analysis and structural model analysis. The high reliability of the questionnaire results means that we can interpret the questionnaire data more confidently and use it for further statistical analysis.

Table3 Reliability analysis

Measurement object	Questionnaire questions	Cronbachs after deleting this Item Alpha value	Cronbachs Alpha value

Digital Literacy(Consciousness)	Con1	0.710	0.822
	Con2	0.723	
	Con3	0.754	
Digital Literacy(Ability)	Abi1	0.876	0.893
	Abi2	0.836	
Digital Literacy(Responsibility)	Dut1	0.823	0.893
	Dut2	0.870	
	Dut3	0.814	
Stress Perception	Pre1	0.845	0.891
	Pre2	0.843	
	Pre3	0.847	
	Pre4	0.842	
Job Performance	Per1	0.816	0.858
	Per2	0.825	
	Per3	0.839	
	Per4	0.822	
	Per5	0.847	

Note: Results are sorted and exported by Spss26.0

In the interval validity test of civil servant performance study, we first pay attention to the descriptive statistical results of each variable. The data show that the average value of the three dimensions of digital literacy (consciousness, ability and responsibility), stress perception and work performance is close to or slightly higher than 3, indicating the civil servants' positive attitude and certain degree of recognition to the digital government construction. The relatively small standard deviation means that the data distribution is relatively centralized, which facilitates subsequent statistical analysis.

Further, we evaluated the differential validity of variables by calculating the mean variance extraction (AVE) and the correlation coefficient between constructs. The ideal interval validity requires that the square root of AVE is larger than the correlation coefficient between constructions. According to the data in Table 4, we can observe that although there is some degree of correlation between variables, no correlation coefficient of any one variable is close to or more than 0.9, which indicates that moderate independence between variables is maintained and the basic requirements for factor analysis are satisfied.

Finally, in order to ensure the rigor of the research and the reliability of the results, it is suggested to take a series of measures to further verify and improve the validity. This includes calculating the AVE value to ensure that the AVE for each construct is greater than 0.5, comparing the square root of the AVE with the correlation coefficient to confirm the validity of the distinction between the variables, performing exploratory or confirmatory factor analysis to verify that the variables form the construct as expected, and adjusting the questionnaire design as necessary. Through these careful analysis and adjustment, the researchers can more accurately capture the civil servants' true desire for digital

government construction, and provide solid data support for the formulation of effective work performance improvement strategy.

Table4 Abierval validity test results for variables

	Average	Standard deviation	Consciousness	Capability	Responsibility	Stress Perception	Job Performance
Consciousness	3.286	0.877	0.768				
Capability	3.578	1.103	0.549	0.791			
Responsibility	3.661	1.305	0.491	0.457	0.774		
Stress Perception	3.268	1.042	0.563	0.531	0.557	0.799	
Job Performance	3.343	1.061	0.489	0.433	0.393	0.44	0.8

Note: The diagonal value is the square root of each construct AVE, and below the diagonal is the Person correlation coefficient of each construct

The KMO test is an indicator used to measure whether the sample is suitable for factor analysis. The KMO value ranges from zero to one, and the closer the value is to one, the more suitable the data is for factor analysis.

Consciousness: The KMO value is 0.926, which is a very high value, indicating that the data is well suited for factorial analysis. Ability: A KMO value of 0.888 also indicates that the data is well suited for factor analysis. Responsibility: The KMO value is 0.827, although slightly lower than the first two, it is still a very high value, and the data is suitable for factor analysis. Stress perception: The KMO value is 0.856, which is also a value suitable for factor analysis. Performance: The KMO value is 0.924, very close to one, and the data is ideal for analysis. Based on the results of the KMO test and the Bartlett's spherical test, the KMO values for all variables were well above the general criterion of 0.6 and the p values for the Bartlett' s spherical test were all less than 0.05, meaning that the correlation matrix for all variables was significantly different from the identity matrix.

Table5 Validity analysis

	Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
		Approx.Chi-Square	df	Sig.
Consciousness	0.926	2407.33	5	0
Ability	0.888	1487.431	10	0
Responsibility	0.827	949.549	6	0
Stress Perception	0.856	1095.588	6	0
Job Performance	0.924	2030.53	15	0

Note: Results are sorted and exported by Spss26.0

In the research of civil servants'performance, correlation analysis is an important step to reveal the relationship between different variables. According to the correlation analysis results in Table 6, we can see that there is significant positive correlation among the three dimensions of digital literacy-consciousness, ability and responsibility. Specifically, the correlation coefficient between consciousness and ability is 0.844, the correlation coefficient between consciousness and responsibility is 0.761, and the correlation coefficient between ability and responsibility is 0.711.

In addition, the three dimensions of digital literacy are also positively correlated with stress perception and job performance. For example, the correlation coefficient between consciousness and stress perception is 0.521, the correlation coefficient between ability and stress perception is 0.494, and the correlation coefficient between responsibility and stress perception is 0.696. These results indicate that the higher the level of digital literacy, the higher their perception of job performance, which may further stimulate their willingness to participate in digital government.

The stress perception itself has a significant positive correlation with job performance, and the correlation coefficient is 0.489, which means that the higher the civil servants' stress perception of digital government construction, the stronger their job performance. However, the correlation coefficient between work performance and other variables is relatively low, which may indicate that work performance may be affected by other factors not considered in addition to digital literacy and stress perception.

In conclusion, the results of correlation analysis provide valuable information for understanding the influencing factors of civil servants'job performance. The enhancement of digital literacy, the improvement of stress perception and the stimulation of work performance are the key factors to promote the success of digital government construction. The future research can further explore the interaction between these variables, and how to stimulate civil servants' work performance by improving digital literacy and stress perception, so as to promote the work performance improvement work more effectively.

Table6 Correlation analysis

	Con	Abi	Res	Stress	Performance
Con	1	.844**	.761**	.521**	.322**
Abi	.844**	1	.711**	.494**	.292**
Res	.761**	.711**	1	.696**	.358**
Stress	.521**	.494**	.696**	1	.489**
Performance	.322**	.292**	.358**	.489**	1

Note: Results are sorted and exported by Spss26.0

Structural Model Analysis

In the study of civil servants'job performance, the results of the model test analysis provided in Table 7 are critical for evaluating the fit of the structural equation model (SEM). Specifically, the

result of Chi-square testis 632.53,corresponding to 206 degrees of freedom. Although the Chi-square value is large, considering the large sample size, this result needs to be comprehensively evaluated in combination with other indicators. The degree of freedom ratio of chi-square is 1.468, which is lower than the critical value of three.

The further goodness-of-fit index shows that the Goodness ofFit Index GFI value is 0.913, which is close to the acceptance criterion of 0.9, indicating that the goodness-of-fit of the model is good. The Root Mean Square Error of Approximation RMSEA value of 0.024, well below the recommended threshold of 0.05, further confirms the superior fit of the model. The value of Root Mean Residual reaches 0.000, which indicates that the residual error of the model is very low and the interpretation of data is strong.

In addition, the Comparative Fit Index value was 0.973, the Normed Fit Index value was 0.933, and the Non-NormedFit Index value was 0.961. All these three indexes exceeded the recommendation standard of 0.9, which further confirmed the goodness offit of the model.

Considering comprehensively, the model test analysis results in Table 7 show that the proposed structural equation model is fitted with actual data very well in statistics. This finding provides researchers with confidence that the model can effectively capture the relationship between factors that influence civil service performance. However, in interpreting these results, the researchers should be cautious and take into account that the construction of the model requires sufficient theoretical support while ensuring the representativeness of the samples and the practical significance of the model.

Table 7 Analysis of model tests

Common index	Judgment standard	Value
$\chi 2$	-	632.53
df	-	206
Chi-square freedom ratio $\chi 2$/df	<3	1.468
GFI	>0.9	0.906
RMSEA	<0.10	0.024
RMR	<0.05	0.000
CFI	>0.9	0.973
NFI	>0.9	0.933
NNFI	>0.9	0.961

Note: Results Amos Collate Export

In the research of civil servants'job performance, the standardized path analysis results provided in Table 8 are of great significance for understanding how different factors affect the job performance of civil servants. Normalized path coefficients can help us quantify the strength of the relationships between variables and determine the statistical significance of these relationships.

First of all, the three dimensions of digital literacy-consciousness, ability and responsibility-show a significant positive impact on civil servants' perception of pressure. Specifically, the standardized

path coefficient of the influence of "consciousness" on the stress perception of digital literacy is 0.185, which is significant at the level of $p<0.05$. The influence coefficient of "ability" is 0.177, and the significance level reaches $p<0.01$; The influence coefficient of "responsibility" is 0.134, which is also significant at the level of $p<0.05$. These results show that the enhancement of digital literacy can significantly improve the civil servants' stress perception of digital government construction.

Further, stress perception itself has been shown to be a significant positive predictor of job performance, with a normalized path coefficient of 0.112, also significant at the level of $p<0.05$. This means that the higher the stress perception of digital government, the better their job performance.

In addition, digital literacy has a direct positive impact on the performance of civil servants. Among them, the influence coefficient of "consciousness" on work performance is 0.131, $p<0.05$; The influence coefficient of "ability" is 0.170, $p<0.01$, showing stronger influence; The influence coefficient of "responsibility" is 0.152, $p<0.05$. The existence of these direct effects indicates that digital literacy not only indirectly affects job performance by improving stress perception, but also directly promotes the participation of civil servants.

In conclusion, the results of standardized path analysis reveal the complex relationship between digital literacy, stress perception and job performance. The enhancement of digital literacy can not only improve the civil servants'stress perception of digital government construction, but also improve their work performance directly. These findings have important enlightenment effect on the development of job performance improvement strategy.

Table8 Analysis of standardised pathways

Assumption	Assumed path relationship	T-value	Standard path coefficient	Conclusion
Hc1	Digital Literacy(Consciousness) → Stress Perception	2.39	0.185*	Support
Ha1	Digital Literacy(Ability) → Stress Perception	2.807	0.177**	Support
Hc2	Digital Literacy (Responsibility) →Stress Perception	2.044	0.134*	Support
Ha2	Stress Perception →Job Performance	1.982	0.112*	Support
Hc3	Digital Literacy(Consciousness) → Job Performance	2.078	0.131*	Support
Ha3	Digital Literacy (Ability) → Job Performance	3.064	0.170**	Support
Hc4	Digital Literacy (Responsibility) →Job Performance	2.221	0.152*	Support

Note: * for $p<0.05$;** for $p<0.01$;*** for $p<0.001$

In the study of civil servants'job performance, the test results of intermediary effect in Table 9 play an important role in revealing the relationship between digital literacy and civil servants' job performance. Mediating effect analysis aims to investigate whether a variable (mediating variable)

plays a role in transmitting between independent variables (e.g., digital literacy) and dependent variables (e.g., job performance).

According to the data in Table 9, we can see that the three dimensions of digital literacy-consciousness, ability and responsibility-have a significant direct impact on the performance of civil servants. Specifically, the direct effect of consciousness on job performance is 0.176, the standard error is 0.052, the t value is 3.668, and the p value is 0.000. The direct effect value of "ability" is 0.141, the standard error is 0.038, the t value is 2.889, and the p value is 0.005. The direct effect value of "responsibility" is 0.185, the standard error is 0.069, the t value is 3.774, and the p value is 0.000. These results show that enhanced digital literacy can directly improve the performance of civil servants without stress perception.

However, when stress perception is considered as a mediating variable, the mediating effect of various dimensions of digital literacy on work performance through stress perception is not significant. For example, the mediating effect of "consciousness" on job performance through stress perception is 0.016, the standard error is 0.010, the t value is 1.710, and the p value is not less than 0.05; The mediating effect value of "ability" is 0.013, the standard error is 0.008, the t value is 1.875, and the p value is not less than 0.05. The intermediate effect value of "responsibility" is 0.014, the standard error is 0.008, the t value is 1.755, and the p value is not less than 0.05. In addition, the 95% self-service confidence interval (BootLLCI) of all intermediary effects contains zero, which further indicates that we cannot rule out the possibility of a zero intermediary effect.

Table 9 Mediated effects test results

Effect type	Specific path	Effect value	Standard error	T value	P value	95% BootLLCI	95% BootLLCI
Direct effect	Digital Literacy (Consciousness) → Job Performance	0.176***	0.052	3.668	0.000	0.081	0.267
	Digital Literacy (Ability) → Job Performance	0.141**	0.038	2.889	0.005	0.035	0.209
	Digital Literacy (Responsibility) → Job Performance	0.185***	0.069	3.774	0.000	0.077	0.246
	Stress Perception → Job Performance	0.141**	0.046	3.097	0.002	0.052	0.231
Intermediary effect	Digital Literacy (Consciousness) → Stress Perception → Job Performance	0.016	0.010	-	-	0.001	0.038
	Digital Literacy(Ability) → Stress Perception → Job Performance	0.013	0.008	-	-	0.001	0.033

	Digital Literacy (Responsibility) → Stress Perception → Job Performance	0.014	0.008	-	-	0.001	0.032

Note: * for p<0.05;** for p<0.01;*** for p<0.001

Conclusion and Enlightenment

Study Conclusion

Through the rigorous quantitative analysis of the survey data of 240 civil servants in Z City, the internal relationship among digital literacy, stress perception and civil servants'job performance is deeply explored, and conclusions with important theoretical and practical significance are drawn.

The research results clearly show that digital consciousness, digital ability and digital responsibility all have significant positive driving effect on job performance. From the perspective of digital awareness, its direct influence coefficient on job performance is significant. For example, in the policy making process, civil servants with high digital awareness can capture the trend of digital technology, integrate the concepts such as big data analysis into planning, make the policy more scientific and targeted, and further improve job performance. The influence of digital ability dimension on work performance is highly significant in statistics. Taking the implementation of people's livelihood policy as an example, civil servants with excellent digital ability can skillfully use professional tools to accurately screen the support objects and efficiently process government affairs data, so as to ensure accurate and effective policy implementation and effectively promote work performance. In the aspect of digital responsibility, the civil servants'responsibility for data security and ethics directly promotes the improvement of work performance. In the process of government affairs data management and disclosure, the civil servants strictly follow the norms, protect the rights and interests of the people, create a good government affairs ecology, reduce the work obstruction, and significantly improve the work efficiency and quality.

As to the mediating effect of stress perception on digital literacy and job performance, although stress perception is positively correlated with digital literacy and job performance, the mediating effect test shows that it is not significant in the path of digital literacy affecting job performance. This means that digital literacy is influenced primarily by its own direct effects on job performance, rather than by the mediating variable of stress perception. However, in the actual work scene, it can still be observed that under the moderate stress perception, the civil servants will actively exploit the advantages of digital literacy to meet the work challenges. However, excessive pressure can hinder the effectiveness of digital literacy, highlighting the importance of properly managing pressure to ensure the stability of civil servants' work performance.

Practice Enlightenment

Based on the above research conclusions, in order to effectively improve the performance of civil servants and promote the construction of digital government, the following practical enlightenment is proposed.

In the aspect of digital literacy cultivation, we should construct a comprehensive, systematic and in-depth training system to promote the digital literacy of civil servants.

As far as digital awareness is concerned, government departments can establish close cooperative relations with universities, scientific research institutions and professional digital technology enterprises and create joint training platforms(王翔 & 余霄, 2023). Hold high-end academic forums and cutting-edge technology seminars regularly, invite domestic and foreign well-known experts and industry elites to deeply analyze innovative application cases and strategic development trends of emerging technologies such as big data, artificial intelligence and blockchain in the global government field, guide civil servants to participate in deep research and exchange, broaden international vision, stimulate their deep cognition and innovative application thinking of digital technology transformation potential, urge them to actively integrate cutting-edge concepts into local government planning and daily work process reshaping, draw on advanced experience, and improve digital awareness and foresight (Halbesleben, J. R., & Buckley, M. R., 2004).

In order to cultivate the digital ability, we should construct the individualized training course system based on the characteristics of civil servants' posts and the difference of business demands. Utilize modern information technology to build an intelligent online learning platform, integrating a wealth of high-quality digital skills learning resources, such as professional software operation tutorials, data analysis case libraries, and digital communication and collaboration simulation scenarios, to support civil servants'independent and flexible learning(马亮, 2020) . At the sametime, offline series of specialized skills workshops and practical training camps will be organized, with senior technical experts and key business personnel providing on-site guidance. These workshops will focus on key capabilities such as in-depth analysis of government data and cross-departmental digital collaboration project management. Through real-world case simulations, team collaboration exercises, and other formats, the training will be intensified to ensure that civil servants master and efficiently use digital tools to solve practical government issues, thereby improving work efficiency and quality (江小涓, 2018).

In the aspect of strengthening digital responsibility, it is necessary to improve the long-term mechanism of laws and regulations and professional ethics education. On the one hand, continuously update and refine the interpretation and application guide of laws and regulations in the field of digital government affairs, combine with typical cases for in-depth analysis, and enhance the civil servants' awareness of legal compliance and risk prevention ability (于君博, 2023); On the other hand, actively cultivate the professional ethics culture of digital government affairs, and put the concept of digital responsibility throughout the career development of civil servants. We should carry forward the professional spirit of adhering to the bottom line of data security, safeguarding people's digital rights and interests, following the digital ethical norms, strengthen the internal responsibility drive of civil servants, ensure that they perform their duties strictly and regularly in the practice of digital government affairs, and establish a firm foundation for the steady development of digital government.

In stress management, government departments should actively create a good organizational atmosphere and work environment. Optimize the design of work flow, according to the characteristics of digital government affairs and the current situation of civil servants' ability, allocate work tasks reasonably,and avoid the excessive pressure caused by overloading and unclear responsibilities(李景

平 & 江和原, 2023). Establish and improve pressure relief mechanism, setup internal psychological counseling service hotline or regularly invite professional psychological counselors to carry out lectures and one-to-one counseling, provide psychological support and coping strategy guidance for civil servants, help them effectively cope with work stress and maintain good working conditions. At the sametime, health work culture is advocated, civil servants are encouraged to arrange work and rest time reasonably, cultural and sports activities are organized, team cohesion is promoted, work tension is alleviated, the negative impact of pressure on work performance is reduced in many aspects, and the effective performance of civil servants in the construction of digital government is guaranteed (王惠琴等, 2023).

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