

Developing Digital Human Resources to Meet the Requirements of Digital Government in Vietnam

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Abstract

Digital government is a developing trend in many countries, based on digital technology, digital data, and operating in a digital environment. With the emergence of digital government, the activities of state agencies are shifting from the physical to the digital environment, creating a demand for the development of digital human resources to operate the digital government. Digital human resources here refer to the entities participating in state governance processes in the digital environment, including both civil servants and citizens. Therefore, developing digital human resources to meet the requirements of digital government means developing digital capabilities for civil servants and citizens to form digital civil servants and digital citizens. This study constructs a theoretical framework to analyze the impact of the development of digital civil servants and digital citizens on digital government. The author surveyed 270 local leaders at the commune level from three provinces in three regions of Vietnam: Bac Ninh province (Northern), Quang Tri province (Central), and Tay Ninh province (Southern). The survey results provide further evidence that civil servants possess basic digital knowledge and skills necessary for working in a digital environment, but these still need improvement; citizens are disseminated and updated with digital knowledge and skills to conduct transactions in the digital environment when participating in state administration, but their digital competence is assessed as low, requiring appropriate solutions to develop digital human resources to meet the requirements of digital government in Vietnam.

Keywords: Digital government; Digital human resources; Digital civil servant; Digital citizens; Vietnam.

1. Introduction

In 2016, the Fourth Industrial Revolution (Industry 4.0) was initiated and rapidly developed, signifying a revolution in smart manufacturing based on the achievements of artificial intelligence, the Internet of Things, biotechnology, and nanotechnology (Phuong, L.Q., 2017). The past 10 years have shown that Industry 4.0 has completely changed the way people live, work, and interact with each other; it has been applied in social activities, creating many breakthroughs for the development of the world.

In this context, Vietnam has adapted to the Fourth Industrial Revolution, changing its methods of state governance and building and operating a digital government to better serve its citizens. The National Digital Transformation Program (PM, 2020) affirms the shift in mindset and methods of state governance, applying digital technology to build a modern, professional administration that serves the people and promotes economic and social development: developing a digital government, developing a digital economy, developing a digital society, and narrowing the digital divide.

In reality, the emergence of the 4.0 revolution has only occurred in the last 10 years, but it has already brought about many changes in the development of digital technology, leading to changes and adjustments in the construction and development of digital governments in various countries. Therefore, research on digital government is necessary and is the reason attracting the author's attention in this study. However, the author identifies the key elements of the analysis as the subjects participating in digital government – the digital workforce, known as digital civil servants and digital citizens.

2. Literature review

Digital government is a model of government that operates in a digital environment, relying on data and digital technology to operate, make decisions, and deliver high-quality public services. MIC (2021) defines digital government as having all operations securely in a digital environment, providing higher quality services, making more timely decisions, and enacting better policies. Similarly, Que, N.D. et al. (2022) affirm that digital government is a redesigned and data-driven model of government operation capable of delivering better services and utilizing resources more optimally.

Sharing the same viewpoint, Vuong, L.D. et al. (2024) further emphasized that digital government fosters development, leads national digital transformation, and creates a favorable environment for citizens to participate in economic and social development. Similarly, Chen, L. et al. (2024) affirmed that digital government helps to formulate better policies, effectively address major issues in economic and social development and management; and attract citizens and social organizations to participate in policy discussions and voting more effectively.

The studies mentioned above have explained many fundamental aspects of digital government, but the most common issue is the operating mechanism of government agencies in the digital environment, based on data and digital technology to make timely and effective decisions, provide higher quality services, and create development for the nation and localities. The content of digital government is explained focusing on several aspects: Government agencies design digital operating models and operate safely in the digital environment; State administration processes are run on a digital technology platform, with data fully and accurately digitized; Public officials and citizens can access digital data quickly and conveniently and conduct transactions efficiently in the digital environment.

To develop a digital government, the key factor – the digital workforce – plays a decisive role. Even with a modern digital infrastructure, if people lack the capacity to use it effectively, the goal of developing a digital government will be difficult to achieve. The digital workforce here refers to the entities involved in state administration processes in the digital environment, including both civil servants and citizens. Therefore, developing a digital workforce to meet the requirements of a digital government means developing the digital capabilities of civil servants and citizens to create digital civil servants and digital citizens.

- Firstly, digital civil servants are defined as subjects directly participating in state governance processes in the digital environment through the performance of professional duties in public service. According to Trung, N.B. (2023), the requirement for civil servants performing public service in the context of digital transformation and building a digital government is to have basic digital knowledge and skills and proactively update knowledge about new technologies to optimize work processes and improve efficiency and quality in handling administrative procedures. Similarly, Bau, D.N. (2025) establishes the view that civil servants must proactively improve their digital capacity, master working skills in the digital environment, and apply digital technology platforms to perform public service effectively. Khanh, T.T.B. (2025) further emphasizes the criteria for evaluating digital civil servants, namely advisory capacity and task execution capacity in the digital environment; The ability to communicate and guide citizens through administrative procedures in the digital environment. Therefore, according to the research perspectives above, basic digital knowledge and skills, and the proactive updating and application of digital knowledge and skills in performing tasks in the digital environment, are identified as criteria for digital civil servants. The content of digital civil servants is interpreted focusing on several aspects: Civil servants are equipped with and updated on basic digital knowledge and skills to work in a digital environment; civil servants advise and implement work in a digital environment, meeting the requirements for progress and quality of assigned professional tasks; civil servants communicate with and guide citizens on administrative procedures in a digital environment accurately and efficiently, creating satisfaction for citizens.

- Secondly, digital citizens are subjects participating in state governance processes in the digital environment through providing feedback, critiquing policies, or requesting the resolution of administrative documents. They need basic digital knowledge and skills to transact in the digital environment when participating in state governance processes in the digital environment. Explaining this issue, Nga, Q. (2023) affirmed that: On a national level, digital capacity not only means improving the quality of life of citizens, creating cohesion and dynamism in society; the development of citizens' digital capacity also strongly promotes the economy of that nation; and therefore, citizens' digital capacity is an important foundation for promoting national economic growth in this era. MIC (2021) and Huong, D.T.T. (2025) identify digital citizens with basic

capacities, including basic digital skills and the ability to access digital information sources; The ability to communicate in a digital environment, such as buying and selling, and conducting transactions on digital platforms. Digital transformation and the building of a digital government aim to serve the people; therefore, digital transformation and the building of a digital government are only successful when each citizen becomes a digital citizen. The meaning of digital citizenship is explained focusing on several aspects: Citizens are provided with basic digital knowledge and skills to conduct transactions in the digital environment; citizens actively participate in/effectively participate in the policy-making process (providing feedback and critique on policies) in the digital environment; citizens are proactive/proficient when conducting transactions/requesting the resolution of administrative documents in the digital environment.

Thus, from an overall perspective, many studies have clearly identified the characteristics of digital government and the digital competency requirements for civil servants and citizens to become digital civil servants and digital citizens. The author inherits these contents when building and developing the theoretical framework for research on digital government, digital civil servants, and digital citizens, as shown in Table 1 below.

Table 1. Theoretical framework for research on digital government, digital civil servants, and digital citizens

Research content	Related research	Developing new research scales.
1. Digital civil servant (CS)		
Basic digital knowledge and skills for working in a digital environment: Advising, executing tasks, and conducting transactions in the digital environment; applying digital technology platforms to perform official duties effectively.	Trung, N.B. (2023); Bau, D.N. (2025); Khanh, T.T.B. (2025).	<p>1. CS1. Civil servants are equipped with and updated on basic digital knowledge and skills to work in a digital environment.</p> <p>2. CS2. Civil servants advise and implement work in a digital environment, meeting the requirements for progress and quality of assigned professional tasks.</p> <p>3. CS3. Civil servants communicate with and guide citizens on administrative procedures in a digital environment accurately and efficiently, creating satisfaction for citizens.</p>
2. Digital citizens (DC)		
Basic digital knowledge and skills for transacting in the digital environment when	MIC (2021); Nga, Q. (2023); Huong, D.T.T. (2025).	4. DC1. Citizens are provided with basic digital knowledge and skills to conduct transactions in the digital environment.

Research content	Related research	Developing new research scales.
participating in state administration processes in the digital environment: Providing feedback and critique on policies or requesting the resolution of administrative documents.		5. DC2. Citizens actively participate in/effectively participate in the policy-making process (providing feedback and critique on policies) in the digital environment. 6. DC3. Citizens are proactive/proficient when conducting transactions/requesting the resolution of administrative documents in the digital environment.
3. Digital government (DG)		
Digital operating model; operating mechanisms of government agencies in the digital environment; providing fast, accurate, and high-quality services.	MIC (2021); Que, N.D. et al. (2022); Vuong, L.D. et al.(2024); Chen, L. et al. (2024).	7. DG1. Government agencies design digital operating models and operate safely in the digital environment. 8. DG2. State administration processes are run on a digital technology platform, with data fully and accurately digitized. 9. DG3. Public officials and citizens can access digital data quickly and conveniently and conduct transactions efficiently in the digital environment.

Source: Compiled by the author through the review

Based on the research overview, the theoretical framework of this study is designed with 3 scales: “Digital civil servant” (CS), “Digital citizens” (DC), and “Digital government” (DG). The theoretical model is built to analyze the influence of the two independent scales/variables “Digital civil servant” (CS) and “Digital citizens” (DC) on the dependent scale/variable “Digital government” (DG) [Figure 1].

Research model

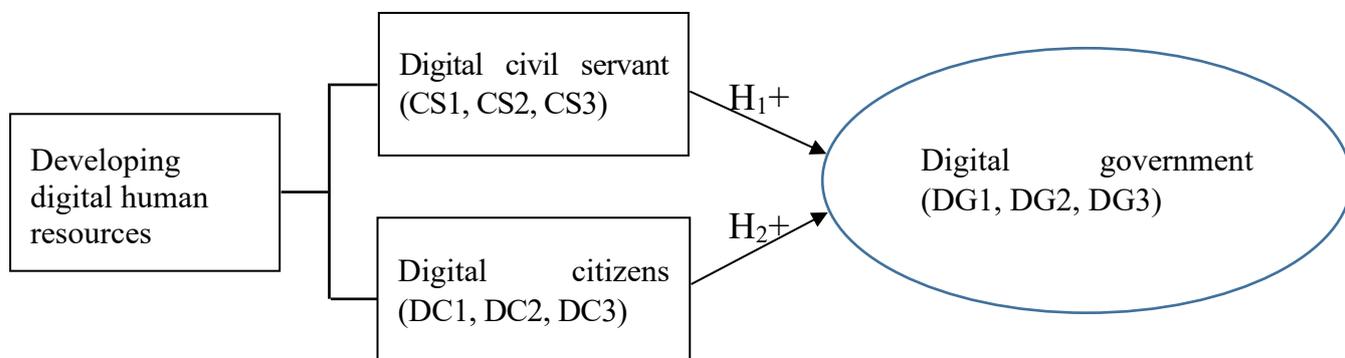


Figure 1. Research model

In the theoretical model above, the author designed 3 scales comprising 9 observed variables into 9 questions in a survey questionnaire and measured them using a 5-point Likert scale: 1 - Strongly disagree; 2 - Disagree; 3 - Neutral; 4 - Agree; 5 - Strongly agree (Figure 1). The author conducted a survey to collect data for analysis and drew conclusions from the empirical research in Vietnam with the hypothesis: Developing digital civil servants (H1) and digital citizens (H2) have a positive and direct influence on Developing digital government.

3. Research methods

In this study, the author uses a combination of qualitative and quantitative methods. The qualitative method involves collecting and analyzing secondary data to build a theoretical framework and model. The quantitative method involves conducting surveys to collect and analyze primary data and draw empirical research conclusions.

The survey sample was selected by the author based on scientific principles. In quantitative research, according to Hair, J.F. et al. (2009), the minimum sample size required for exploratory factor analysis and regression analysis of the model with 3 scales and 9 observed variables in this study is $N = 9 \times 5 = 45$. From this minimum sample size, the author conducted a survey with an actual sample size of $N = 270$ ($N > 45$) of local leaders at the commune level in 3 provinces across 3 regions of Vietnam, including Bac Ninh province (Northern), Quang Tri province (Central), and Tay Ninh province (Southern).

The survey was conducted selectively, involving local leaders with four or more years of management experience, and with the respondents' consent. The results showed 270 out of 270 valid responses, achieving a 100% response rate.

4. Research results and discussion

First, using the survey results of $N = 270$ local commune-level leaders, the author tested the reliability of the scales and observed variables in the research model to serve as a basis for conducting further analyses. In quantitative research, scales and observed variables have reliability when they meet the standard conditions: Cronbach's $\alpha > 0.6$; Corrected Item-Total Correlation > 0.3 (Hair, J.F. et al., 2009). The test results show that all 3 scales and 9 observed variables have reliability when they meet the standard conditions of Hair, J.F. et al. (2009), as shown in Table 2 below.

Table 2. Statistical results and testing results of the scale

Scales	Observed variables	N	Min	Max	Mean	Std. Deviation	Cronbach' Alpha	Corrected Item-Total Correlation
1. Digital civil servant (CS)	CS1	270	1	5	4.11	.691	.706	CS1 = .612
	CS2	270	1	5	4.13	.703		CS2 = .604
	CS3	270	1	5	4.07	.686		CS3 = .596

2. Digital citizens (DC)	DC1	270	1	5	4.06	.665	.678	DC1 = .552
	DC2	270	1	5	3.99	.671		DC2 = .483
	DC3	270	1	5	4.01	.702		DC3 = .512
3. Digital government (DG)	DG1	270	1	5	4.10	.682	.689	DG1 = .602
	DG2	270	1	5	4.12	.701		DG2 = .574
	DG3	270	1	5	4.09	.692		DG3 = .494
Valid N (listwise)		270						

Source: Author's survey results

Table 2 shows that the observations of the scales “Digital civil servant” (CS), “Digital citizens” (DC), and “Digital government” (DG) are all rated at a mean of ≥ 3.99 and mean of ≤ 4.13 , which are statistically significant according to the Likert scale (1-5). This indicates that the evaluation opinions are concentrated, contributing to the affirmation that local governments design digital operating models and state governance processes are operated based on digital technology; civil servants and citizens are disseminated/equipped with and updated basic digital knowledge and skills to work and transact in the digital environment; data is fully and accurately digitized, helping civil servants and citizens to quickly and conveniently access digital data and conduct effective and safe transactions in the digital environment.

However, specifically, the observed variables of the "Digital citizens" (DC) scale were rated at the lowest average values: Mean (DC1) = 4.06, Mean (DC2) = 3.99, Mean (DC3) = 4.01. This also contributes to showing that, although citizens have been provided with basic digital knowledge and skills to transact in the digital environment, many citizens still do not effectively participate in policy-making processes (providing feedback, critiquing policies) in the digital environment; they are not proficient in transacting/requesting the resolution of administrative documents in the digital environment. While citizens are the subjects participating in the process of local government administration in the digital environment, limitations in digital capacity will be a barrier, directly affecting the effectiveness of state administration and directly impacting the goal of building a digital government. Therefore, solutions to develop digital capabilities for citizens are urgently needed so that localities can proactively build digital resources for the goal of developing a digital society in parallel with the development of a digital government.

With the test results meeting the standards, all three scales and nine observed variables in the model were used for further analysis. The author conducted exploratory factor analysis with Varimax rotation to preliminarily assess the unidimensionality, convergent validity, and discriminant validity of the scales and to test the fit of the theoretical model.

Table 3. Total Variance Explained

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.737
Bartlett's Test of Sphericity	Approx. Chi-Square	3147.542
	df	36

Sig.	.000
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Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.428	38.085	38.085	3.428	38.085	38.085	3.082	34.244	34.244
2	3.020	33.559	71.644	3.020	33.559	71.644	2.877	31.972	66.215
3	1.098	12.203	83.847	1.098	12.203	83.847	1.587	17.632	83.847
4	.491	5.455	94.985						
5	.168	1.869	96.854						
6	.142	1.582	98.436						
7	.099	1.101	99.537						
8	.042	.463	100.000						
9	.491	5.455	94.985						

Extraction Method: Principal Component Analysis.

Source: Author's survey results

Table 4. Rotated Component Matrix

Rotated Component Matrix ^a				
Scales	Observed variables	Component		
		1	2	3
1. Digital civil servant (CS)	CS1	.922		
	CS2	.876		
	CS3	.808		
2. Digital citizens (DC)	DC1		.836	
	DC2		.853	
	DC3		.794	
3. Digital government (DG)	DG1			.843
	DG2			.875
	DG3			.859

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.
 a. Rotation converged in 5 iterations.

Source: Author's survey results

Survey data shows: $KMO = 0.737 > 0.5$, confirming that exploratory factor analysis is appropriate for the dataset; Bartlett's test has an observed significance level $Sig. = 0.000 < 0.05$, indicating that the observed variables are linearly correlated with the representative factor; Total Variance Explained with Cumulative % = 83.847% > 50%, showing that 83.847% of the variation in the representative factors is explained by the observed variables (Table 3). All observed variables have Factor Loading > 0.5 (Table 4), indicating that the observed variables are statistically significant.

Initial Eigenvalues stop at 3 factors with Eigenvalues > 1 (Table 3), indicating that the observed variables were extracted into 3 factors corresponding to the 3 original

factors. Thus, the original research model is preserved and is scientifically appropriate; confirming the suitability of the theoretical research model on digital government, digital competence of civil servants, and digital competence of citizens, with 3 scales and 9 observed variables as constructed.

Based on the exploratory factor analysis results above, all three scales and nine observed variables have good reliability and statistical significance. Further multivariate regression analysis will be conducted to examine the relationships between the scales in the research model: two independent scales/variables “Digital civil servant” (CS) and “Digital citizens” (DC), and one dependent scale/variable “Digital government” (DG).

Table 5. Multivariate regression results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	VIF
		B	Std. Error	Beta			
1	(Constant)	1.124	.234		12.129	.000	
	1. Digital civil servant (CS)	.530	.381	.505	11.426	.000	1.812
	2. Digital citizens (DC)	.466	.342	.402	9.397	.000	1.874
a. Dependent Variable: Digital government (DG)							
R ² = 0.746; Durbin-Watson = 2.101							

Source: Author's survey results

Table 5 data shows:

+ $R^2 = 0.746$, confirming that the "Digital civil servant" (CS) and "Digital citizens" (DC) scales explain 74.6% of the variation in the "Digital government" (DG) scale; $VIF = 1.812$ and $VIF = 1.874$ ($1 < VIF < 2$), indicating that the regression model does not exhibit multicollinearity; Durbin-Watson = 2.101 ($1 < d < 3$), indicating that the regression model does not exhibit autocorrelation, confirming that the "Digital civil servant" (CS) and "Digital citizens" (DC) scales are independent and influence each other on the "Digital government" (DG) scale, thus confirming the suitability of the theoretical research model to the survey dataset.

+ The regression coefficients of the two independent variables “Digital civil servant” (CS) and “Digital citizens” (DC) are both statistically significant (Sig. = 0.000, Sig. < 0.05) and positive: $B(\text{CS}) = 0.530$ and $B(\text{DC}) = 0.466$, confirming a positive correlation between the two independent variables “Digital civil servant” (CS), “Digital citizens” (DC) and the dependent variable “Digital government” (DG); hypotheses H1 and H2 are accepted; and the initial research model's suitability is further confirmed.

Based on the general regression model $Y = B_0 + B_1 \cdot X_1 + B_2 \cdot X_2 + \dots + B_i \cdot X_i + e$ (Hair, J.F. et al., 2009), the multivariate regression model of this study is determined as: $DG = 1.124 + 0.530 \cdot CS + 0.466 \cdot DC$. The correlation levels of the independent and

dependent variables in decreasing order are: “Digital civil servant” (CS), “Digital citizens” (DC).

Based on the regression analysis results in Table 5 and the statistical results in Table 2, this study further confirms the empirical findings in Vietnam, that:

- Firstly, local governments design digital operating models and state governance processes that are based on digital technology; civil servants and citizens are provided with/equipped with and updated basic digital knowledge and skills to work and transact in the digital environment; data is fully and accurately digitized, helping civil servants and citizens to access digital data quickly and conveniently and conduct transactions efficiently and safely in the digital environment.

- Secondly, although citizens have been provided with basic digital knowledge and skills for conducting transactions in the digital environment, many still do not effectively participate in policy-making processes (providing feedback and critique on policies) in the digital environment; they are not yet proficient in conducting transactions/requesting the resolution of administrative documents in the digital environment.

While citizens are key participants in local government governance in the digital environment, limitations in digital capacity will be a barrier, directly affecting the effectiveness of government administration and the goal of building a digital government. Therefore, solutions to develop digital capacity for citizens are urgently needed so that localities can proactively build digital resources for the goal of developing a digital society in parallel with the development of a digital government. Accordingly, localities need to diversify communication about the digital society and digital government to popularize skills in using online tools, information security, and utilizing digital services; build community digital technology groups to proactively train and educate citizens in digital knowledge and skills in their residential areas, helping them to be more confident, safe, and effective in the digital environment, towards building a civilized digital society.

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