

Review Article

# Apparatus Competency Gap in SPBE Services: An Analysis of Public Administration Literature

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**Abstract:** The implementation of Electronic-Based Government Systems (*Sistem Pemerintahan Berbasis Elektronik*/SPBE) represents a strategic instrument of public administration reform aimed at improving service quality, efficiency, and governance through digital transformation. However, empirical evidence across countries indicates that the effectiveness of digital government initiatives is frequently constrained by persistent competency gaps among public sector personnel. This study conducts a thematic literature review to systematically identify, classify, and synthesize scholarly findings on competency gaps affecting SPBE and digital government implementation within the field of public administration. Drawing on peer-reviewed international literature published over the last decade and indexed in Scopus, Web of Science, and DOAJ, the review applies a narrative–synthetic approach supported by thematic analysis. The findings reveal four dominant dimensions of competency gaps: technical–digital competencies, managerial and digital leadership competencies, cross-sectoral collaborative competencies, and adaptive learning competencies. These gaps are shaped by interacting individual, organizational, and systemic factors, including misaligned human resource management practices, fragmented bureaucratic structures, and limited capacity-building mechanisms. Using Competency-Based Human Resource Management (CBHRM) as the primary analytical lens, and reinforced by Digital Government Theory, Digital Era Governance, and Capacity Building Theory, this study demonstrates that competency gaps are structural rather than merely individual deficiencies. The article contributes theoretically by integrating human resource and digital governance perspectives into a unified analytical framework, and practically by offering policy-relevant insights for strengthening public sector capacity and enhancing the sustainability of SPBE implementation.

**Keywords:** Competency Gap; Digital Era Governance; Digital Government; Public Sector Competence; SPBE.

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## 1. Introduction

The digital transformation of the public sector has become a global agenda that fundamentally changes the way governments design, manage, and deliver public services. This shift marks a transition from a hierarchical and procedural traditional bureaucracy paradigm to a digital government that emphasizes service integration, information technology utilization, and orientation to user needs. Public administration literature shows that government digitalization is not just the adoption of technology, but a process of institutional change that affects organizational structure, inter-sector relations, and the role of state apparatus. In the perspective of digital government theory, technology is understood as a factor that interacts with formal rules, norms, and organizational capacity, so that the results

of transformation are highly dependent on the institutional readiness and human resources of the government (Fountain, 2001). In line with that, the digital-era approach of governance emphasizes that digitalization encourages the reintegration of government functions and simplification of administrative processes, which demands new competencies from public servants (Dunleavy et al., 2006). Therefore, the digital transformation of the public sector cannot be separated from the administrative dimension and the capacity of the apparatus as the main actor in the implementation of digital policies (Margetts & Dunleavy, 2013).

In the national context, the digital government agenda in Indonesia is institutionalized through the Electronic-Based Government System (SPBE) which is positioned as a strategic instrument for public administration reform. SPBE is designed to improve the quality of public services, bureaucratic efficiency, transparency, and government accountability through the use of digital technology that is integrated across sectors and levels of government. In line with global practices, SPBE represents an effort to shift from sectoral e-government to digital government that is holistic and governance-oriented. However, various studies show that the success of digital government is not solely determined by technological infrastructure, but by the ability of public organizations to manage changes and develop the competence of the apparatus (OECD, 2021). Digital government requires officials who not only master technical skills, but also have managerial, coordinated, and adaptive capacity in a dynamic digital environment. Thus, SPBE must be understood as a public administration reform agenda that has direct implications for the government's human resource management system (OECD, 2021; United Nations, 2022)

However, the implementation of SPBE in developing countries faces complex challenges, especially from the perspective of institutional and human resource capacity of the apparatus. The empirical literature shows that there is a gap between the demands of digital government competencies and the actual capacity of public apparatus, which includes limited digital skills, low data-based managerial skills, and weak institutional capacity to manage digital innovation. These challenges are often exacerbated by organizational fragmentation, rigid regulations, and bureaucratic cultures that are not fully adaptive to digital change (Cordella & Paletti, 2019; Mankevich et al., 2023). In this context, SPBE risks being reduced to a mere technology project without producing substantive improvements in public service performance. Cross-country studies also show that the failure of digital transformation in the public sector is often rooted in the unpreparedness of the apparatus as street-level and system-level implementers of digital policies (Giest, 2024). Therefore, analysis of the competence of the apparatus is a crucial element in assessing the effectiveness of SPBE implementation.

In the discipline of Public Administration, the study of the competence gap of apparatus in digital government has significant conceptual and policy relevance. Conceptually, this issue enriches the discourse on the relationship between administrative reform, bureaucratic capacity, and institutional change in the digital age. From a policy perspective, a comprehensive understanding of the patterns and causes of apparatus competency gaps is needed to design a human resource development strategy that is in line with the SPBE agenda. However, the existing literature is still scattered and tends to be fragmented between technology studies, human resource management, and public administration. This condition shows the need for a thematic literature review that systematically synthesizes empirical and theoretical findings related to the competence of the apparatus in the implementation of SPBE. Thus, this study seeks to bridge this knowledge gap and provide an analytical foundation for the development of sustainable digital government policies. (Haug & Søndergård, 2024; Tangi et al., 2021)

The competence of public sector apparatus in the context of digital transformation of government can no longer be understood narrowly as conventional administrative skills, but rather as a multidimensional combination that includes technical, managerial, digital, and adaptive competencies. Technical competencies are related to mastery of procedures and regulations, while managerial competencies include coordination, decision-making, and leadership skills in complex organizational environments. Digital transformation adds dimensions of digital competence, such as data literacy, understanding of information systems, and the ability to interact with algorithm-based technology. In addition, adaptive competencies—the ability to continuously learn, innovate, and respond to change—are becoming increasingly crucial in the context of a dynamic digital government. In the framework of Competency-Based Human Resource Management (CBHRM), competence is seen as the conformity between the demands of organizational roles and individual capabilities, so that changes in the digital work environment directly demand a redefinition of

apparatus competency standards (Boyatzis, 2008). Thus, SPBE requires apparatus that is not only administratively competent, but also able to function effectively in an integrated digital government ecosystem. (Boyatzis, 2008; Blanka et al., 2022)

However, various international empirical studies show that there is a significant competency gap between the demands of digital government and the actual capacity of public sector apparatus. The literature reports that many apparatuses do not have adequate digital skills to effectively manage electronic-based government systems, especially in terms of data integration, information analysis, and the use of smart technologies. This gap occurs not only at the operational technical level, but also at the strategic level, such as data-driven policy formulation and digital organizational change management. Cross-border studies indicate that digital transformation is often faster than the ability of apparatus to adjust its competencies, creating an imbalance between systems and human resources (Mankevich et al., 2023). From the perspective of digital government, this condition has the potential to hinder the realization of public value from government digitalization. Therefore, the apparatus competency gap emerged as one of the main obstacles in the sustainable implementation of SPBE. (Mankevich et al., 2023; Cordella & Paletti, 2019)

The literature analysis also identified a number of structural and organizational factors that contribute to the occurrence of apparatus competency gaps. From the perspective of CBHRM, the mismatch between the needs of digital competencies and the government's human resource management system—including recruitment, training, and career development—is the main cause of the persistent competency gap. Many public organizations still rely on HR development models that are administrative and less responsive to competency changes triggered by digitalization. In addition, organizational resistance and a hierarchical bureaucratic culture often hinder the adoption of digital work practices and innovative learning. Capacity inequality between levels of government and between agencies also exacerbates this condition, creating disparities in the ability to implement SPBE. These findings are in line with the perspective of Digital Era Governance, which emphasizes that the failure of digital reforms often stems from institutional limitations, not technology itself (Dunleavy et al., 2006; Haug & Søndergård, 2024).

The competency gap of the apparatus has wide implications for the effectiveness of SPBE implementation, the quality of public services, and the achievement of public administration reform goals. The literature shows that apparatus with limited digital competence tends to experience difficulties in operating and integrating the SPBE system, which has an impact on low service quality and fragmentation of administrative processes. Furthermore, the inability of the apparatus to manage digital change can reduce public trust in electronic-based services and undermine the legitimacy of bureaucratic reform. In the perspective of CBHRM, this condition reflects a systemic failure to align HR development strategies with the digital government agenda. Therefore, the competence gap of the apparatus is not just a technical issue, but a strategic issue that determines the success or failure of SPBE as an instrument of public administration reform. The academic and policy urgency of this study lies in the need to systematically understand the pattern of competency gaps as the basis for the formulation of more effective policy interventions. (Tangi et al., 2021; OECD, 2021)

Research on SPBE and digital government in the Public Administration literature over the past decade shows a strong tendency to focus on the technological, regulatory, and infrastructure aspects of government information systems. Many studies have focused on e-government architecture design, system interoperability, data security, as well as regulatory frameworks that support the digital transformation of the public sector. This approach places the success of digital government primarily as a matter of technological readiness and system governance, assuming that the apparatus will automatically adapt to digital changes. Although this perspective is important, a number of studies confirm that digital government is a process of institutional change that is much more complex than just technological modernization (Fountain, 2001; United Nations, 2022). As a result, the administrative and human resources dimensions are often treated as secondary or implicit issues. This condition creates a conceptual gap in understanding the non-technological factors that determine the effectiveness of SPBE implementation.

Furthermore, literature that explicitly discusses the competence of apparatus in digital government generally still positions competence partially and technocratically. Many studies link the competence of the apparatus to basic digital skills or technical training of information systems, without integrating them fully into the public sector human resource management framework. Competency is often treated as a supporting variable for technology

implementation, rather than as a strategic construct that shapes the capacity of public organizations. This approach tends to ignore the managerial, leadership, and adaptive dimensions that are crucial in the context of continuous digital change. A number of cross-border empirical studies show that digital government failures often occur even though technological infrastructure is available, due to the unpreparedness of the apparatus in managing organizational change (Mankevich et al., 2023; Cordella & Paletti, 2019). Thus, there are significant limitations in the literature that have not placed the competence of the apparatus as a core issue of public administration. (Mankevich et al., 2023; Cordella & Paletti, 2019)

In addition, although the concept of Competency-Based Human Resource Management (CBHRM) has long developed in the management and public administration literature, its application in the study of digital government is still relatively limited and fragmented. The existing literature uses CBHRM as a normative framework for human resource development, without systematically synthesizing the apparatus competency gap in the context of government digital transformation. Until now, there are still few literature reviews that specifically map the pattern of competency gaps in public officials using CBHRM as the main analytical lens. In fact, CBHRM provides a strong conceptual framework to analyze the incompatibility between the demands of the digital role of apparatus and the government's human resource management system. These limitations hinder the development of a deeper theoretical understanding of the relationship between digital reform and apparatus capacity. Therefore, a literature review is needed that explicitly places CBHRM in the discourse of digital government and SPBE. (Boyatzis, 2008; Blanka et al., 2022)

Furthermore, the Public Administration literature still rarely links CBHRM, Digital Government Theory, Digital Era Governance (DEG), and Capacity Building Theory in one comprehensive analytical framework. Existing studies tend to use each theory separately, thus failing to capture the multidimensional dynamics of apparatus competence in the digital transformation of government. In fact, the integration of the four perspectives allows for a more holistic analysis, covering the dimensions of individuals, organizations, and institutions simultaneously. The absence of this integrative approach leads to a partial and less operational understanding of the apparatus competence gap for public policy formulation. Thus, there is a clear academic need to conduct a thematic literature review that synthesizes empirical and theoretical findings across perspectives. This study is positioned to fill this gap by offering a conceptual synthesis that enriches the development of theories and practices of Public Administration in the era of SPBE and digital government. (Dunleavy et al., 2006; Haug & Søndergård, 2024)

The main purpose of this literature review is to identify, classify, and synthesize previous research findings related to the competence gap of apparatus in the implementation of the Electronic-Based Government System (SPBE) and digital government. In particular, this study is directed to collect empirical and conceptual evidence from the Public Administration literature that discusses the relationship between apparatus competence and digital government performance. The thematic synthesis approach is used to integrate findings across studies that have been scattered and fragmented. Thus, this article not only summarizes the existing knowledge, but also rearranges the discourse of apparatus competencies in the context of the digital transformation of government. This goal is in line with the academic need to clarify the non-technological factors that determine the success of digital government. The international literature confirms that without a systematic understanding of the capacity of the apparatus, the government's digitalization agenda risks producing limited benefits (United Nations, 2022; Tangi et al., 2021).

In addition to these main objectives, this literature review has a number of specific objectives that deepen the analysis of the apparatus competency gap. First, this study maps the dimensions of public sector apparatus competencies—including technical, managerial, digital, and adaptive competencies—as identified in the digital government literature. Second, this article analyzes the factors that cause the competency gap, including the limitations of the human resource development system, bureaucratic culture, organizational resistance, and capacity inequality between levels and government agencies. Third, this study synthesizes the implications of the competency gap on the effectiveness of digital governance, the quality of public services, and the sustainability of public administration reform. These objectives are formulated to connect the competence of the apparatus with the achievement of digital government performance in a more conceptual and empirical way. A number of studies show that the misalignment between the demands of digital systems and the capacity of the

apparatus is a major obstacle to the digital transformation of the public sector (Mankevich et al., 2023; Cordella & Paletti, 2019).

In terms of theoretical contributions, this article provides significant enrichment for the development of Public Administration Science through the integration of several main perspectives in one literature synthesis framework. This literature review explicitly combines Competency-Based Human Resource Management (CBHRM) with Digital Government Theory, and is supported by the perspectives of Digital Era Governance (DEG) and Capacity Building Theory. This integration allows for a more holistic analysis of the apparatus competency gap, covering the individual, organizational, and institutional dimensions simultaneously. Different from previous studies that tend to use these theories separately, this article places them as a unified analytical lens for interpreting the literature findings. Thus, this study contributes to strengthening the theoretical basis regarding the relationship between digital reform and bureaucratic capacity. This approach is in line with the literature's call to develop a more integrative conceptual understanding in digital government studies (Dunleavy et al., 2006; Haug & Søndergård, 2024).

In addition to theoretical contributions, this article also offers practical and policy contributions relevant to the formulation and implementation of SPBE. The resulting literature synthesis provides a conceptual basis for policy makers to understand the types and sources of apparatus competency gaps in digital governance. The findings of this study can be used as a reference in designing strategies for developing apparatus capacity, including recruitment system reform, competency-based training, and digital talent management in the public sector. Furthermore, this article supports the formulation of SPBE policies that are more human-centered digital government, not solely on technology. Thus, this literature review serves as a bridge between the development of theory and practice of digital public administration. This section also leads the discussion to the next chapter, which systematically reviews the literature and theoretical frameworks that are the basis for the analysis of the competency gap of apparatus in SPBE. (OECD, 2021; Giest, 2024)

## 2. Literature Review

### Competency-Based Human Resource Management (CBHRM)

Competency-Based Human Resource Management (CBHRM) is a human resource management approach that places competence at the core of individual and organizational performance management. In Boyatzis' classical thought, competence is defined as the fundamental characteristics of an individual that are causally related to effective or superior performance in a job role, including the dimensions of knowledge, skills, abilities, and attitudes (Boyatzis, 2008). In contrast to the traditional HR approach that focuses on job descriptions and formal qualifications, CBHRM emphasizes the dynamic fit between the demands of the role and the actual capabilities of the individual. This approach allows organizations to respond to changes in the work environment through an ongoing redefinition of competencies. In the context of digital transformation, CBHRM is becoming increasingly relevant because technological changes directly shift the demands of apparatus competencies. Therefore, CBHRM provides a robust analytical framework to understand the gap between digital competency needs and the actual capacity of apparatus in SPBE implementation. (Boyatzis, 2008; Audrin & Audrin, 2024)

In the public sector, the implementation of CBHRM has its own characteristics because state apparatus operates in an environment full of regulations, public accountability, and complexity of interests. Public administration literature shows that CBHRM is used to support bureaucratic reform through strengthening apparatus capacity, improving public service performance, and professionalizing government human resource management. Unlike the private sector, CBHRM in the public sector must balance the demands of efficiency with the values of public service, legality, and justice. In the context of digital government, apparatus is required not only to meet administrative competency standards, but also to develop digital and adaptive competencies to manage technological changes. Recent studies confirm that CBHRM helps governments map out new competency needs that arise due to the digitization of public processes and services. Thus, CBHRM is an important instrument to explain why many public organizations experience a gap in the competence of apparatus in the implementation of SPBE. (Hendrikx & Hondeghem, 2024; Boyd et al., 2024)

Empirical findings from international journals show that the implementation of CBHRM contributes positively to the performance of apparatus and the readiness of public

organizations in the face of digital transformation. Studies have shown that public organizations that associate recruitment, training, and career development with a clear competency framework tend to be more adaptive to digital change. CBHRM allows for the systematic identification of competency gaps, so that HR development interventions can be directed more on target. In the context of digital government, this approach has proven to be relevant to improve the digital literacy of apparatus, data-based managerial skills, and collaboration across organizational units. Cross-border research also indicates that CBHRM supports strengthening the capacity of public organizations in managing digital innovation and algorithm-based technologies. Thus, CBHRM functions as a conceptual bridge between the individual competencies of the apparatus and the performance of the SPBE system as a whole. (Blanka et al., 2022; Giest, 2024)

Despite its strong analytical and practical potential, the literature also reveals a number of limitations in the application of CBHRM in the public sector. One of the main challenges is the gap between the formally formulated normative competency framework and the actual practice of managing human resources of the apparatus. Institutional factors, such as the rigidity of personnel regulations and seniority-based career systems, often hinder the consistent implementation of CBHRM. In addition, a hierarchical bureaucratic culture and resistance to change weakens efforts to develop adaptive and digital competencies. In the context of SPBE, this condition causes the competencies required by the digital system to not be fully internalized in the work practices of the apparatus. Therefore, the literature emphasizes that the competency gap of the apparatus is not only an individual problem, but a reflection of structural limitations in the implementation of CBHRM in the public sector. This critical analysis places CBHRM as the main lens to understand the root of the problem of apparatus competence in digital government and becomes a direct basis for thematic analysis in the results and discussion sections. (OECD, 2021; Haug & Søndergård, 2024)

### **Digital Government / E-Government Theory**

The concept of e-government initially developed with a main focus on the use of information technology to improve the efficiency of administration and the provision of public services electronically. This approach emphasizes the digitization of existing processes, such as the automation of services and the provision of online information, without fundamentally changing the structure and logic of traditional bureaucracy. Along with increasing technological complexity and public expectations, the literature has shifted the focus from e-government to digital government, which is understood as a comprehensive transformation of governance. Digital government includes not only the use of technology, but also changes in processes, organizational structures, and relationships between states, citizens, and non-state actors. This conceptual shift places digitalization as an integral part of public administration reform, not just a technology project. In the context of SPBE, this shift requires apparatus with competencies that go beyond basic technical skills, including managerial and adaptive skills in the government's digital ecosystem (United Nations, 2022; OECD, 2021).

The main theoretical foundation in understanding digital government is largely referred to the thoughts of Jane E. Fountain, who introduced the concept of technology enactment and emphasized the importance of institutional context in determining the results of government technology implementation. Fountain argues that technology does not work deterministically, but rather is "enacted" through organizational structures, rules, norms, and the capacity of public actors. Thus, the failure or success of digital government is highly dependent on the institutional readiness and competence of the apparatus that operates it. This perspective emphasizes that digital systems such as SPBE cannot be separated from existing administrative practices and bureaucratic capacity. In line with that, technology is seen as a catalyst for change that can strengthen or even reproduce bureaucratic weaknesses if it is not balanced with the development of apparatus competencies. The Fountain framework provides a strong conceptual basis for analyzing apparatus competency gaps as a key factor in the implementation of SPBE (Fountain, 2001).

Patrick Dunleavy and his colleagues' perspective through the concept of Digital Era Governance (DEG) complements the understanding of digital government by emphasizing the reorientation of public administration towards functional reintegration, citizen-based needs, and digitalization of end-to-end processes. DEG views digitalization as a response to the limitations of New Public Management, with a focus on cross-organizational coordination and the use of technology for the simplification of public services. In this framework, the

public apparatus plays a central role as a link between the digital system and the needs of the community. Dunleavy emphasized that changes in administrative structures and processes triggered by digitalization directly change the demands of apparatus competencies, especially in terms of collaboration, data management, and information-based decision-making. Without strengthening these competencies, digital government has the potential to produce new fragmentation instead of integration. Therefore, the DEG strengthens the argument that the apparatus competency gap is a structural obstacle in the implementation of SPBE. (Dunleavy et al., 2006; Margetts & Dunleavy, 2013).

A synthesis of international empirical literature shows that the success of the implementation of digital government is more determined by the capacity and competence of the apparatus than simply the availability of technology. Cross-border studies report that large investments in digital infrastructure are not always directly proportional to improving the quality of public services if the apparatus does not have adequate competence. Competency gaps often arise in the form of limited digital literacy, weak data-based managerial skills, and low coordination capacity across government units. Recent research also shows that apparatus that is not ready for digital change tends to replicate old bureaucratic practices in new systems, thus hindering substantive transformation. These findings confirm that digital government is a matter of organization and human resources, not just technology. In the context of SPBE, this literature strengthens the urgency of analyzing the competency gap of apparatus as a determining factor for the effectiveness of government digital policies (Mankevich et al., 2023; Tangi et al., 2021).

However, the digital government literature also faces criticism for its technocentric tendencies, namely excessive focus on system design and technological innovation without deep integration with the perspective of public sector human resource management. Many studies still separate technology analysis from the issue of apparatus competence, so that they fail to capture the dynamics of digital government implementation as a whole. This kind of approach risks simplifying the problem of SPBE implementation into a technical problem, even though the public administration literature shows that the failure of digital reform often stems from human and institutional factors. The lack of integration with frameworks such as CBHRM and capacity building has led to a partial understanding of the apparatus competency gap. Therefore, an analytical approach is needed that links the theory of digital government with the systematic management of apparatus competencies. This sub-section places Digital Government Theory as a conceptual bridge to thematic analysis of the apparatus competency gap in the implementation of SPBE in the results and discussion sections (Cordella & Paletti, 2019; Haug & Søndergård, 2024).

### **Digital Era Governance (DEG)**

The concept of Digital Era Governance (DEG) was introduced by Patrick Dunleavy as a critical response to the limitations of the New Public Management (NPM) paradigm and traditional public administration in dealing with the complexity of digital governance. The DEG is characterized by three main elements, namely reintegration (the reintegration of fragmented government functions), needs-based holism (a service approach based on the needs of citizens), and digitalization (the use of digital technology end-to-end in government processes). In contrast to NPM which emphasizes decentralization, contractualism, and market-based efficiency, DEG focuses on coordinating, integrating, and simplifying administrative structures through digital technology. This paradigm also goes beyond rigid traditional bureaucracy by encouraging process flexibility and public service orientation. Within the framework of DEG, digitalization is understood as a means to build more integrated and responsive governance. Therefore, the DEG provides an important perspective to analyze how SPBE demands structural changes and the competence of the apparatus that is different from the previous administrative paradigm (Dunleavy et al., 2006).

Furthermore, DEG views the digital transformation of government as not just the adoption of information technology, but as a restructuring of administrative processes, the role of actors, and the capacity of public organizations. Digitalization in the perspective of DEG requires changes in the way bureaucracy works, including cross-unit data management, inter-agency coordination, and integrated service provision. Public apparatus no longer plays a role as the implementer of administrative procedures alone, but as an information manager, liaison between systems, and facilitator of citizens' needs. These changes directly increase the competency demands of apparatus, especially in cross-functional capabilities and understanding of complex digital systems. The DEG also emphasized that the success of

digitalization depends on the ability of public organizations to adapt work structures and practices. In the context of SPBE, this perspective implies that the failure to integrate digital services is often rooted in the limited capacity and competence of the apparatus, not in the technology itself (Margetts & Dunleavy, 2013).

A synthesis of international empirical literature shows that the DEG agenda is highly dependent on the readiness and competence of the apparatus in managing integrated digital change. Various studies report that service integration and reintegration of government functions can only be achieved if apparatus has the ability to collaborate across organizations and have adequate data literacy. Competence in information-based decision-making and the use of digital systems is the main prerequisite for the realization of public value from digitalization. In contrast, the limitations of apparatus competencies often lead to digital systems being reduced to separate sectoral applications, contrary to the principle of DEG holism. Cross-border research also shows that apparatus that are not competently prepared tend to maintain old work patterns in new systems, thus hindering substantive transformation. This finding confirms that the apparatus competency gap is a structural obstacle in the implementation of DEG principles, including in the implementation of SPBE (Tangi et al., 2021; Mankevich et al., 2023).

In the context of developing countries, the Public Administration literature highlights various challenges in implementing DEG that are closely related to the competence gap of the apparatus. Bureaucratic fragmentation, capacity inequality between levels of government, and limitations in human resource development systems weaken reintegration efforts and holism of digital services. In addition, a hierarchical bureaucratic culture and resistance to change often hinder the development of collaborative and adaptive competencies needed in the DEG paradigm. Empirical studies show that without serious investment in strengthening the competence of the apparatus, government digitalization risks deepening performance inequality between agencies. In the context of SPBE, this condition is reflected in the low interoperability of the system and the uneven quality of digital services. Therefore, DEG strengthens the argument that the apparatus competency gap is not a purely individual issue, but a structural problem in the contemporary digital government agenda that must be systematically analyzed in the study of Public Administration (Cordella & Paletti, 2019; Haug & Søndergård, 2024).

### **Capacity Building Theory in Public Administration**

Capacity building in Public Administration is generally understood as a planned process to improve the ability of government actors and institutions to be able to carry out public functions effectively, adaptively, and sustainably, especially in the context of policy changes and a dynamic governance environment. Important references in the literature emphasize that capacity building cannot be reduced to individual training alone, but must be read as a link between human resource development, organizational performance, and administrative structures that form the "workforce" of the state. Grindle and Hilderbrand underline that sustainable capacity demands consistency between competency development interventions (e.g. training), organizational improvement, and rule/incentive reform so that competencies built are truly mobilized in bureaucratic practice. With this perspective, the apparatus competency gap in the implementation of SPBE can be understood as a symptom of the insynchronization between the demands of the government's digital capabilities and the capacity ecosystem that supports the apparatus. In the broader tradition of institutional development, Grindle also places capacity building as a state capability agenda that is inherent in political-administrative and governance configurations, not just a technical issue of human resource management. Therefore, capacity building is relevant as a supporting framework to explain why digital transformation—including SPBE—often faces competency barriers that are structural, not just individual. (Grindle & Hilderbrand, 1995; Grindle, 1997).

Conceptually, capacity building is commonly operated at three levels that interact with each other, namely individuals, organizations, and systems. At the individual level, capacity building focuses on improving competencies (knowledge, skills, and work attitudes) needed to carry out service and governance functions, including digital competencies and adaptive ability to face changes in electronic-based work processes. At the organizational level, capacity building emphasizes the alignment of structure, processes, work culture, leadership, and coordination mechanisms so that individual competencies can be converted into organizational performance. At the system level, attention is directed to regulatory frameworks, institutional architecture, HR policy governance, and data/technology

ecosystems that enable public organizations to transform in an integrated manner. The literature on digital skills in the public sector shows that the digital competence of apparatus is ineffective if it is positioned as "end-user proficiency" alone; it should be understood as a socio-technical capability to design, manage, and evaluate ICT-based policies and services in a specific institutional context. In the context of SPBE, this three-level framework helps bridge the competency gap analysis: it is not enough to assess the capacity of the apparatus as a personal attribute, but must test whether organizations and government systems provide prerequisites for digital competencies to function (Grindle & Hilderbrand, 1995; Cordella et al., 2024).

Empirical findings in the international literature reinforce the argument that capacity building is an important determinant for the success of public administration reform and digital transformation of government. A study in *Government Information Quarterly* confirms that government's digital transformation operates through cross-bureaucratic dynamics—such as technology- and policy-driven flexibility—thus requiring the capacity of organizations and apparatus to manage simultaneous changes to processes, enterprise architectures, and cross-unit governance. On the other hand, a systematic review of the success of public sector digital transformation identifies recurring success factors, including HR capacity, leadership, project governance, and the ability of institutions to align digital change with public service needs. This means that the "capacity" in digital government is not only infrastructure, but also the ability of apparatus and organizations to integrate end-to-end processes, data, and services—in line with the SPBE logic that emphasizes the integration of electronic governance. In the framework of capacity building, these findings make it clear that technology investment without investment in the capacity of apparatus and organizations will result in superficial adoption (simply automation), not governance transformation. Thus, capacity building can be positioned as a conceptual mechanism that connects the competency needs of SPBE with the organization-system prerequisites that allow the competency to "work" in implementation (Gong et al., 2020; Escobar et al., 2023).

However, the literature also shows the limitations and challenges of capacity building that are prominent in developing countries, especially when the digital government agenda is evolving faster than the bureaucracy's capacity to absorb change. Limited resources (budget, time, experts), fragmentation of human resource policies between agencies, and low integration between training and organizational needs often result in training without transfer, namely knowledge enhancement that does not transform into changes in service performance. In addition, when capacity building is not connected to organizational reforms and incentive systems, new competencies tend to be "locked" to the individual and not become institutional capabilities that can be scaled across units. The literature also criticizes technocentric tendencies in digital policy, which assumes that automated system modernization encourages capacity modernization, when in fact there is a need for capacity building designs that link competencies with process and governance changes. In a systematic study of e-government/AI implementation capacity in developing countries, the aspects of "human capital and expertise" and "organisational capacity development" emerge as crucial domains that determine the shift from potential to benefit realization—which is conceptually aligned with the need for SPBE to simultaneously strengthen the competence of the apparatus and organizational capabilities. Therefore, the apparatus competency gap in SPBE needs to be understood as a failure to orchestrate capacity building across levels (individual–organization–system), not as a mere training deficit (Grindle & Hilderbrand, 1995; Kampira & Mukonza, 2025).

### **Comprehensive Theoretical Synthesis**

The literature synthesis shows that Competency-Based Human Resource Management (CBHRM) and Digital Government/E-Government Theory complement each other in explaining the dynamics of the apparatus competency gap in the implementation of SPBE. CBHRM provides a primary lens for understanding the fit (or mismatch) between the demands of digital job roles and the capabilities of apparatus at the individual level, including knowledge, skills, abilities, and attitudes. Meanwhile, Digital Government Theory places the competence of the apparatus in the context of governance transformation and governance processes influenced by technology, institutions, and organizational practices. The integration of these two perspectives emphasizes that competence is not a mere personal attribute, but the result of an interaction between digital system design, institutional rules, and HR management practices. Thus, the competency gap of apparatus in SPBE can be understood

as a structural problem that arises when the digital system develops faster than the adaptation of competencies and human resource governance. This synthesis makes it clear that strengthening the competence of the apparatus must be treated as an integral part of the government's digital reform, not as an additional intervention (Boyatzis, 2008; Fountain, 2001; Tangi et al., 2021).

The role of Digital Era Governance (DEG) enriches the analytical framework by explaining the governance dimensions and cross-sectoral competency needs that emerge in the digital governance agenda. The DEG emphasizes the reintegration of government functions, a service approach based on the needs of citizens, and the digitalization of end-to-end processes in response to bureaucratic fragmentation. This perspective shows that the success of SPBE is not only determined by the technical capabilities of the apparatus, but also by collaborative, coordinated, and data-driven decision-making competencies across units. The empirical literature indicates that the failure to achieve the principles of holism and reintegration often stems from the limited competence of the apparatus to work across functions and organizations. Thus, DEG helps explain why the apparatus competency gap is systemic and has a direct impact on the integration of digital services. The integration of DEG into the synthesis framework emphasizes that the apparatus competency gap is a structural obstacle in the SPBE agenda oriented towards integrated governance (Dunleavy et al., 2006; Margetts & Dunleavy, 2013).

Within the framework of this synthesis, Capacity Building Theory is positioned as a connecting mechanism that explains how the apparatus competency gap can be bridged in a sustainable manner. Capacity building emphasizes capacity building at the individual, organizational, and system levels, so that the competence of the apparatus does not stop at training, but is internalized in institutional structures, processes, and incentives. The literature shows that without the alignment of these three levels, the digital competencies developed are less likely to be mobilized in work practices and service performance. In the context of SPBE, capacity building serves to align the competency development of apparatus with the needs of organizations and digital government policy frameworks. This approach also helps explain the variation in SPBE performance between agencies and levels of government, even though it uses similar technological systems. Therefore, capacity building is a key element in the analytical framework to comprehensively understand the dynamics of the apparatus competency gap (Grindle & Hilderbrand, 1995; Cordella et al., 2024).

Based on the integration of CBHRM, Digital Government Theory, DEG, and Capacity Building Theory, this article formulates a synthesis conceptual framework to analyze the apparatus competency gap in the implementation of SPBE. Narratively, this framework positions SPBE as a driver of changes in governance and governance processes that produce new competency demands for the apparatus. Competency gaps arise when these demands are not balanced by adequate HR management systems, organizational capacity, and systemic support. Factors causing the gap include the weakness of CBHRM, limited institutional capacity, bureaucratic culture, and fragmentation of digital governance. The implications of this gap are reflected in the low integration of services, the quality of digital public services, and the achievements of public administration reform. This conceptual framework is the main reference for BAB Method and Results and Discussion, and affirms the scientific contribution of this article in enriching the analysis of Public Administration regarding the competence of the apparatus and digital government (OECD, 2021; Haug & Søndergård, 2024).

### 3. Materials and Methods

This study uses a thematic literature review design with a narrative-synthetic approach to examine the gap in the competence of apparatus in the implementation of the Electronic-Based Government System (SPBE) and digital government. This design was chosen because the issue of apparatus competence is multidimensional and spread across various theoretical traditions of Public Administration, so it requires conceptual synthesis across studies, not statistical aggregation. Thematic literature review allows for the identification of recurring patterns, themes, and conceptual relationships in the literature, while providing space for critical analysis of differences in research contexts and approaches. In the study of public policy and digital government, this approach is commonly used to summarize heterogeneous empirical findings and build an integrated analytical framework. The narrative-synthetic approach is also relevant to integrate the theories of CBHRM, Digital Government, Digital Era Governance, and Capacity Building in one analysis flow. Thus, this design is suitable for

research purposes that focus on mapping and synthesis of apparatus competency gaps (Paré et al., 2015; Snyder, 2019).

The literature search strategy is carried out systematically through several international academic databases, namely Scopus, Web of Science, and DOAJ, which are known to index reputable and peer-reviewed journals. Google Scholar is used selectively to complement searches, especially to identify relevant articles that have not been fully indexed on the main database. The publication year range is focused on the last 5-10 years to capture the latest dynamics of digital transformation of government and apparatus competencies. Keywords are formulated in an integrated manner using Boolean operators, including: "competency gap" AND "public sector", "digital government" OR "e-government" AND "human resource", as well as "SPBE" OR "digital bureaucracy" AND "public administration". This strategy is designed to balance the breadth and accuracy of the search. A similar approach is recommended in the literature review in the field of public policy and government information systems (Tranfield et al., 2003; Tangi et al., 2021).

Inclusion and exclusion criteria are established to ensure the quality and relevance of the literature analyzed. Articles are included if (1) they are published in reputable and peer-reviewed international journals, (2) focus on the public sector or Public Administration, (3) discuss the competence, capacity, or capabilities of the apparatus in the context of digital government/SPBE, (4) are written in English, and (5) are available in full-text. On the other hand, articles are excluded if (1) they are non-academic or not peer-reviewed, (2) are popular opinions, media reports, or blogs, (3) focus purely on technical aspects of IT without the context of public administration, or (4) are duplicates of publications. The application of these criteria is important to maintain the consistency and validity of thematic synthesis. This kind of selection practice is recommended in the literature review of Public Administration and digital governance (Snyder, 2019; Haug & Søndergård, 2024).

The literature selection procedure is carried out through several successive stages, starting from the title screening, followed by an abstract review, and ending with a full-text assessment. In the early stages, titles that are not relevant to the topic of apparatus competence and digital government are eliminated. The abstract stage is used to assess the suitability of the research focus with the purpose of the literature review. Passing articles are then read thoroughly to ensure conceptual and methodological alignment with inclusion criteria. The entire selection process is supported by a reference manager (e.g. Mendeley or Zotero) to manage citations and avoid duplication. This phased procedure improves the transparency and replicability of the review (Paré et al., 2015; Tranfield et al., 2003).

Data analysis was carried out using thematic analysis, which allowed the identification and synthesis of thematic patterns across studies. The analysis process begins with the initial coding of key concepts related to apparatus competencies, digital government, and SPBE. Furthermore, the codes are grouped into broader themes, such as technical/digital competencies, managerial competencies, adaptive competencies, factors that cause the gap, and policy implications. The final stage is in the form of a cross-article thematic synthesis to interpret the relationship between themes and build a comprehensive understanding of the apparatus competency gap. This approach follows the well-established thematic analysis guidelines in policy research and public organizations. Thematic analysis was chosen because it is flexible and able to accommodate the diversity of methods and research contexts being reviewed (Virginia Braun & Victoria Clarke, 2006; Haug & Søndergård, 2024).

To ensure the validity and reliability of the literature review, several quality control measures were implemented, including transparency of the search strategy, consistency of selection criteria, and cross-study comparisons at the synthesis stage. However, this study has limitations, including the potential for publication bias due to the dominance of English-language journals and the limited scope of the databases used. Additionally, a focus on peer-reviewed literature may exclude relevant policy reports that are not published in journals. This limitation is recognized as part of the characteristics of literature review and is a consideration in interpreting the findings. With this understanding, the Methods section is designed to provide a credible and replicable methodological foundation for thematic analysis in the Results and Discussion section (Snyder, 2019; Paré et al., 2015).

#### 4. Results and Discussion

The results of the thematic synthesis show that the gap in the competence of apparatus in the implementation of SPBE and digital government is accumulated on several main themes that are consistent across state contexts. The first theme is the digital-technical

competency gap, which includes data literacy, system interoperability, information security, and understanding end-to-end digital processes. The second theme relates to managerial competencies and digital leadership, including the ability to manage change, make data-driven decisions, and align policy objectives with system design. The third theme highlights cross-sectoral collaborative competencies, such as inter-agency coordination, cooperation with technology providers, and digital ecosystem management. The fourth theme is adaptive competence and continuous learning, which determines the ability of the apparatus to respond to technological and policy dynamics. The consistency of these themes indicates that the competency gap is structural and not limited to the technical domain alone (Mankevich et al., 2023; Cordella et al., 2024).

Cross-study discussions revealed that the causes of the competency gap in apparatus operate at the individual, organizational, and system levels simultaneously. At the individual level, the limitations of digital literacy and practical experience with integrated systems are an initial barrier, especially when training is generic and non-contextual. At the organizational level, structural fragmentation, data silos, and weak change leadership increase the gap between SPBE's demands and apparatus capacity. At the system level, the rigidity of personnel regulations, seniority-based career schemes, and inconsistencies in HR policies across agencies hinder systemic competency updates. Cross-country comparisons show that these constraints are more prominent in developing countries, although they also appear in different forms in developed countries. These findings confirm that competency gaps cannot be explained as individual deficits alone, but rather as a consequence of public HR governance and policy design (Tangi et al., 2021; Haug & Søndergård, 2024).

The interpretation of the findings through the lens of Competency-Based Human Resource Management (CBHRM) shows a fundamental mismatch between the competency needs of SPBE and the human resource management practices of the apparatus. The literature shows that competency frameworks are often formulated normatively, but are not integrated into recruitment, career development, and performance appraisals. As a result, the digital and managerial competencies required by the SPBE system are not internalized as apparatus performance standards. From the perspective of CBHRM, this condition reflects a failure to align the demands of digital work roles with the actual capabilities of individuals and organizational incentives. This discrepancy explains why technology investment is not always directly proportional to improving service performance. Thus, CBHRM places the competency gap as a problem of public human resource system design that requires comprehensive reform (Boyatzis, 2008; Blanka et al., 2022).

Strengthening the analysis through Digital Government Theory and Digital Era Governance (DEG) shows that the apparatus competency gap is also closely related to the demands of integration and governance reorientation. Digital government emphasizes institutional change and technology enactment, so that the competence of the apparatus determines whether technology improves or reproduces bureaucratic weaknesses. DEG adds dimensions of functional reintegration and needs-based holism, which demand cross-unit collaborative competence and data-driven decision-making skills. The synthesis of empirical findings shows that without these competencies, digital systems tend to be fragmented and do not achieve the promised service integration. This explains the variation in SPBE performance between institutions even though they use similar technology platforms. Therefore, the integration of Digital Government Theory and DEG strengthens the argument that the apparatus competency gap is a structural obstacle in the digital government agenda (Fountain, 2001; Dunleavy et al., 2006).

In the perspective of Capacity Building Theory, the apparatus competency gap is understood as a failure to orchestrate cross-level capacity development. The literature shows that individual training that is not followed by organizational changes and incentive systems results in training without transfer. Effective capacity building requires alignment of individual development, organizational restructuring, and systemic policy support so that competencies can be mobilized into performance. In the context of SPBE, this approach explains why strengthening the capacity of the apparatus must be accompanied by process reform, data governance, and cross-agency coordination. Cross-contextual comparisons indicate that countries with an integrated capacity building approach are better able to reduce competency gaps and improve the performance of digital government. Thus, capacity building serves as a key mechanism to bridge the competency gap identified by CBHRM and digital government theory (Grindle & Hilderbrand, 1995; OECD, 2021).

The implications of this synthesis finding on the implementation of SPBE and digital-based public administration reform are significant. The apparatus competency gap has been

proven to have an impact on low service integration, quality of user experience, and sustainability of digital innovation. The literature also shows that failure to address competency gaps can erode public trust in digital services and undermine the legitimacy of bureaucratic reform. Conversely, CBHRM alignment, organizational capacity strengthening, and the application of DEG principles contribute to improved digital governance performance. The added value of this literature review lies in the integrative synthesis that links the competence of the apparatus with the design of human resources governance and policies, beyond the technocentric approach. Thus, these results and discussions affirm the position of apparatus competence as a strategic determinant of SPBE's success in the treasures of Public Administration and Digital Government (Giest, 2024; Haug & Søndergård, 2024).

## 5. Conclusion

This literature review synthesizes the main findings that show that the gap in the competence of apparatus in the implementation of SPBE and digital government is multidimensional and consistent across state contexts. The most prominent forms of gaps include technical-digital competencies, managerial competencies and digital leadership, cross-sectoral collaborative competencies, and adaptive competencies and continuous learning. The factors that cause it to operate simultaneously at the individual, organizational, and government system levels include limited digital literacy, organizational fragmentation, rigidity of personnel regulations, and weak alignment of HR policies. Cross-study synthesis shows that this gap is not solely caused by a lack of individual skills, but rather by the governance design and management of public human resources that are not yet responsive to the demands of digitalization. Thus, the competence of the apparatus has emerged as a strategic determinant of the success of SPBE which is equally important as technological infrastructure. These findings are consistent with the international literature that emphasizes the central role of apparatus capacity in the digital transformation of the public sector (Mankevich et al., 2023; Cordella et al., 2024).

Analytically, the findings answer the research objectives and close the research gaps that have been identified in the introduction. Different from previous studies that tend to be technocentric or position the competence of the apparatus as a supporting variable, this literature review emphasizes competence as the core issue of Public Administration in digital government. The thematic synthesis shows that the failure or success of SPBE is highly dependent on the alignment between the demands of the digital system and the capacity of the apparatus that manages it. With this approach, the article not only maps the problem, but also describes the structural mechanisms that reproduce the competency gap. This fills the void of literature that has not systematically integrated the issue of apparatus competence in the digital government discourse. Therefore, this study strengthens the argument that SPBE analysis needs to shift from a focus on technology to a focus on governance and human resources (Tangi et al., 2021; Haug & Søndergård, 2024).

In terms of theoretical contributions, this article enriches Public Administration Science through the integration of Competency-Based Human Resource Management (CBHRM) with Digital Government Theory, Digital Era Governance (DEG), and Capacity Building Theory in one integrated conceptual framework. CBHRM is used to explain the incompatibility between the competency demands of SPBE and the HR management practices of the apparatus, while Digital Government Theory and DEG provide a context for institutional and governance transformations that trigger new competency demands. Capacity Building Theory complements the analysis by describing the cross-level capacity development mechanisms needed to bridge the gap. The integration of these four perspectives allows for a more holistic understanding of the relationship between apparatus competencies, digital governance design, and public service performance. Thus, this article offers a theoretical synthesis that goes beyond the partial use of theory in previous studies. This contribution is relevant to the development of Public Administration theory in the increasingly complex era of digital government (Boyatzis, 2008; Dunleavy et al., 2006).

The practical and policy implications of the findings of this literature review emphasize the need to reorient the strategy of apparatus capacity development in the implementation of SPBE. The government needs to align its recruitment, training, career development, and performance assessment systems with the need for dynamic digital and managerial competencies. In addition, strengthening the capacity of the apparatus must be accompanied by organizational reform and an incentive system so that the competencies developed can be

effectively mobilized in work practice. The literature also shows the importance of a human-centered approach to digital government, which places the apparatus as key actors of transformation, not just technology users. With this conceptual basis, the article provides a strategic reference for policy makers to strengthen the implementation of SPBE in a sustainable manner. The implications of this policy are in line with international recommendations on the development of digital talent in the public sector (OECD, 2021; Giest, 2024).

However, this literature review has a number of limitations that need to be examined. First, focusing on English-language articles and international databases could potentially exclude relevant findings from local contexts or non-journal policy reports. Second, the nature of thematic review limits the ability to draw strong causal conclusions about the relationship between apparatus competence and SPBE performance. Therefore, further research is recommended to develop survey-based empirical studies or in-depth case studies, as well as cross-border comparative studies to test and enrich the proposed conceptual framework. Further research can also explore the operationalization of apparatus competency indicators that are more contextual to SPBE. With this research agenda, academic discourse and public policy practices related to digital governance can be developed in a more evidence-based manner. These recommendations are in line with the literature's call to strengthen the connections between theory, empirical evidence, and Public Administration practice in the digital age (Snyder, 2019; Paré et al., 2015).

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