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Digital Capabilities and Business Process Reengineering in Public Administration: Evidence from Civil Status Transformation in Algeria

القدرات الرقمية وإعادة هندسة العمليات في الإدارة العمومية: دراسة تطبيقية حول مصلحة الحالة المدنية في الجزائر

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Abstract :
Public administration in Algeria has experienced notable transformations through the integration of digital capabilities and Business Process Reengineering (BPR), especially in civil status services. This study examines the relationship between digital capabilities and BPR and their effect on administrative performance. Using a case study approach, it explores challenges and opportunities in digital transformation. Findings show that advanced digital capabilities, including modern information systems and skilled personnel, enhance BPR effectiveness, improving service quality, reducing errors, and accelerating processes. The study emphasizes aligning technology with organizational structures and culture to ensure successful transformation, offering actionable insights for policymakers.
Keywords: Digital capabilities, Business Process Reengineering, Public administration, Civil status, Digital transformation.

JEL classification codes : H11, H83, M15, L86, D73

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1. Introduction.

Digital transformation has emerged as a critical priority for governments worldwide, driven by the need to enhance efficiency, transparency, and citizen-centered service delivery. Advances in digital technologies, including automation, data analytics, and integrated information systemshave significantly expanded the capacity of public administrations to redesign processes and improve operational performance. Business Process Reengineering (BPR) has emerged as a particularly important approach in this context, emphasizing the fundamental redesign of workflows to eliminate inefficiencies, reduce redundancies, and better align administrative processes with the needs of citizens. Unlike incremental reforms, BPR aims for transformative change by reconsidering the very structure of organizational operations rather than merely automating existing practices.

Despite the growing emphasis on digital transformation and BPR, the implementation of these initiatives in the public sector often falls short of expectations. In many cases, governments focus primarily on technology adoption, digitizing existing processes without addressing underlying structural and procedural inefficiencies. This partial approach frequently results in limited improvements in service quality, processing times, and transparency, while leaving bureaucratic bottlenecks largely intact. The problem is particularly pronounced in emerging economies, such as Algeria, where public institutions contend with legacy systems, resource constraints, and deeply entrenched administrative procedures(Herchi& Ferdi, 2025).

From a theoretical perspective, existing frameworks provide important insights but remain incomplete. The Resource-Based View (RBV) emphasizes the strategic importance of digital capabilities as organizational resources. However, it does not fully explain how these capabilities are operationalized within administrative processes to achieve measurable performance improvements. Similarly, while the broader digital transformation literature identifies the potential of technology to enable innovation, it often overlooks the complex interaction between digital capabilities, process redesign, and institutional constraints. This creates a critical gap; digitalization alone rarely produces transformative results unless it is accompanied by intentional process reengineering and organizational alignment. Despite significant investments in digital technologies and ongoing reform initiatives, Algerian civil status services continue to face inefficiencies, delays, and errors, limiting citizen satisfaction and administrative effectiveness. The central research problem is therefore: **How can digital capabilities effectively enable Business Process Reengineering to overcome structural and institutional barriers in Algerian public administration?** In other words, what

combination of technological, organizational, and institutional factors is necessary to translate digital investments into measurable performance improvements? Addressing this question is crucial for understanding why digital transformation initiatives often fail to achieve their intended outcomes and for providing actionable insights for policymakers.

This study addresses the identified gap by developing a capability-based framework that examines the relationship between digital capabilities, BPR, and administrative performance in civil status services in Algeria. By integrating empirical evidence with theoretical insights from the RBV, the study contributes in three key ways. First, it provides a capability-oriented perspective on digital transformation, emphasizing the alignment between digital resources and process redesign. Second, it identifies institutional and organizational constraints that influence the success of transformation initiatives. Third, it offers empirical insights from a developing country context, which is underrepresented in existing literature. Collectively, these contributions provide a more comprehensive understanding of digital transformation in public administration and generate practical guidance for policymakers seeking to improve service delivery and organizational performance.

1. Conceptual Framework: Business Process Reengineering, and Public Administration Performance

1.1. The evolution Business process reengineering

BusinessProcess Reengineering (BPR) emerged as a major management innovation aimed at achieving radical improvements in organizational performance. Initially conceptualized by Michael Hammer and James Champy (1993) in *Reengineering the Corporation*, BPR emphasizes the fundamental rethinking and radical redesign of processes to achieve dramatic performance improvements (as cited in Kassahun et al., 2012). Its defining characteristics include fundamentality**,** which questions basic assumptions;radicality**,** which discards existing structures rather than incrementally modifying them; and dramatic results**,** which aim for order-of-magnitude improvements rather than marginal gains.

Kassahun et al. (2012, p.3) define Business Process Reengineering as "fundamental rethinking and radical redesign of government processes to achieve dramatic improvements in critical contemporary measures of performance such as cost, quality, service, and speed".Recent conceptualizations increasingly position BPR within broader digital transformation frameworks.Escobar et al. (2022) identify process redesign as one component of digital transformation alongside technology adoption, organizational culture change, and business model

innovation.This evolution reflects recognition that sustainable improvement requires systemic change rather than isolated process interventions.

1.2. BPR Principles in Public Administration

Early public-sector BPR adopted the private-sector models focused on radical redesign and technology, often failing due to neglect of institutional specificities. It later evolved into a more integrated approach, where, as highlighted by Al-Khouri (2011), transformation combines process redesign, technology, organizational change, and citizen engagement.

Public sector BPR differs from private sector applications due to institutional and contextual constraints. Legal and regulatory frameworks limit process redesign flexibility (Stemberger et al., 2007), while the presence of multiple stakeholders with competing interests complicates change management (Taher et al., 2015). Additionally, performance evaluation extends beyond efficiency to include equity, transparency, and accountability (Escobar et al., 2022). Political environments introduce instability and short-term pressures (AlGumlasi et al., 2023), and organizational cultures tend to resist radical change (Taher et al., 2015). Finally, resource limitations and civil service constraints further restrict implementation options (Mitrović et al., 2018).

While the distinctive characteristics of public administration impose significant constraints on Business Process Reengineering (BPR), they do not preclude its application; rather, they necessitate context-sensitive adaptation. Traditional BPR approaches, rooted in technical-rational models of organizational efficiency, fail to adequately capture the institutional, political, and normative complexities of the public sector. In response, the concept of Government Process Reengineering (GPR) has emerged to reflect the need for modified frameworks that integrate legal compliance, stakeholder multiplicity, and governance requirements. As defined by Kassahun et al. (2012), GPR preserves the core principle of radical process redesign while extending performance objectives beyond efficiency to encompass equity, accountability, and democratic values. Within this adapted perspective, public sector process reengineering increasingly converges with digital transformation, emphasizing workflow simplification, reduction of manual intervention, and the deployment of integrated digital infrastructures(Chewe et al., 2025). Empirical evidence supports this evolution, such as E-SAKIP in Indonesia demonstrates measurable gains in transparency and administrative efficiency and increased throughput efficiency from baseline levels of 37-50% to 69-86% (Handayani, 2024). Analysis of BPR implementation in Tanzania's public sector identified stakeholder engagement, leadership

commitment, organizational readiness, citizen-centric approaches, information technology integration, change management, and legal reform as essential elements for success (Chewe et al., 2025).However, these outcomes remain contingent upon sustained institutional support, infrastructural capacity, and leadership commitment, underscoring that digital transformation in public administration is not merely a technical endeavor but a deeply institutional process (Satria et al.,2025).

2. Theoretical Foundation of the Business Process Reengineering.

The theoretical foundations of Business Process Reengineering (BPR) draw on multiple disciplines. From industrial engineering, BPR inherits process-oriented thinking and workflow analysis; from information systems, it adopts the concept of technology-enabled organizational transformation; and from strategic management, it incorporates perspectives related to competitive advantage and organizational capabilities (Hammer & Champy, 1993; Davenport, 1993). This multidisciplinary heritage has enriched the conceptual development of BPR but has also generated a degree of conceptual ambiguity.

The Resource-Based View (RBV), as developed by Jay Barney (1991), emphasizes that organizational performance depends on the possession and deployment of valuable, rare, inimitable, and non-substitutable resources. In the context of public administration, these resources include data infrastructures, digital platforms, analytical tools, and integration capabilities (Herchi& Ferdi, 2025). While RBV highlights the strategic importance of resources, it is inherently static, focusing on their existence rather than on the processes through which they are transformed into performance outcomes.

Digital transformation in the context of BPR can therefore be more effectively understood as a capability-driven process, where technological resources alone are insufficient to produce meaningful improvements. Transformation outcomes depend on the organization's ability to develop, align, and deploy capabilities that embed digital resources within redesigned workflows and administrative routines (Weerakkody et al., 2021; Atobishi et al., 2024). Early stages of BPR may rely on basic information technologies infrastructure and technological readiness, but effective process redesign requires the development of process management, reconfiguration, and integration capabilities. Advanced digital capabilities, such as interoperability, which were defined by the European Commission (2017)as the ability of information systems to exchange data and enable the sharing of information and knowledge, coordination, and data integrationthereby enabling more complex

organizational outcomes, including improved efficiency, service quality, and citizen satisfaction (Kubrak et al., 2023).

This perspective highlights that progression in digital transformation is not automatic. Without alignment between digital resources and organizational capabilities, investments in technology remain underutilized, and performance gains are limited or uneven (Martin, 2006; Andersen, 2006; Battilani, 2002).

Overall, integrating the principles of BPR with the RBV reframes digital transformation as a capability-mediated process, where technology becomes a source of performance improvement only when embedded within strategically redesigned processes and supported by aligned organizational routines. This approach provides a robust theoretical lens for understanding both the potential and limitations of digital transformation in public administration.

3. Integrating BPR and Digital Transformation Technologies In public administration

Digital transformation has emerged as a central strategic priority for both private and public organizations, as it fundamentally reshapes how value is created, delivered, and sustained. Unlike traditional information technology adoption, which primarily focuses on efficiency gains, digital transformation entails deep structural and organizational change, including the reconfiguration of processes, the development of new competencies, and the redesign of service delivery models (Vial, 2019; Schilirò, 2024).

In the context of public administration, digital transformation is closely associated with the evolution of e-government systems aimed at enhancing transparency, efficiency, and citizen engagement (Tiach&Marghich, 2023). However, the mere introduction of digital technologies does not automatically lead to improved performance. Instead, meaningful transformation requires a systematic redesign of underlying processes, which is precisely the role of Business Process Reengineering (BPR)(Fetais et al., 2022).

BPR provides the conceptual and methodological foundation for rethinking administrative workflows, while digital technologies act as enablers that operationalize and scale these redesigned processes. This interdependence suggests that digital transformation and BPR should not be treated as separate initiatives but as mutually reinforcing components of a unified transformation logic embedded within the broader Business Process Management (BPM) lifecycle (Ahmad& Van Looy, 2020).

3.1. BPR Steps within the BPM Lifecycle

Business Process Management (BPM) is recognized as a comprehensive set of methods and techniques aimed at identifying, modeling, monitoring, and improving organizational processes. It encompasses the design and analysis of workflows, the measurement

of performance data, and the optimization and automation of processes through the effective integration of human, technological, and financial resources (Ahmad, Van Looy, 2020).

The integration of BPR within the BPM lifecycle provides a structured and iterative approach to organizational transformation. Rather than focusing solely on technological deployment, this approach emphasizes a comprehensive understanding of existing processes, followed by their systematic redesign and continuous improvement.

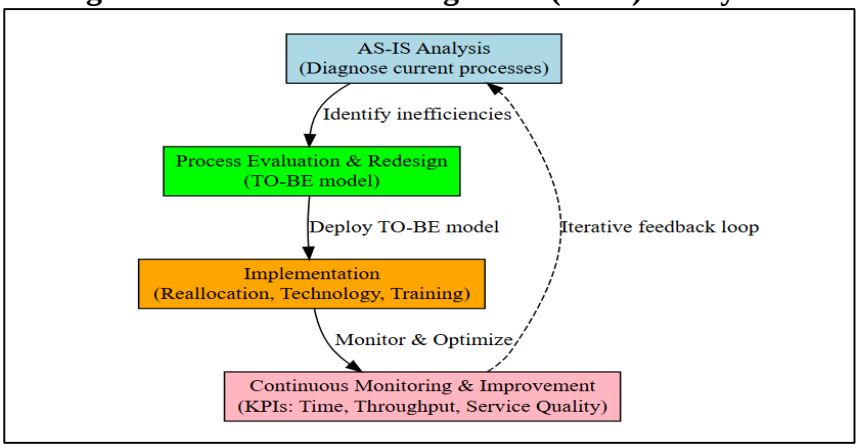
a. The transformation process begins with AS-IS analysis, where organizations identify critical processes that significantly affect performance and service deliveryBisogno et al. (2016). These processes are typically characterized by inefficiencies such as delays, redundancies, high operational costs, or low service quality. The objective at this stage is not to propose solutions, but to develop a diagnostic understanding of how processes actually function(Gawin & Marcinkowski, 2015; Lopez-Pintado et al., 2022).

b. Following the AS-IS phase, organizations engage in process evaluation and redesign, where inefficiencies identified in the AS-IS model are systematically addressed. This stage focuses on eliminating redundant activities, simplifying approval structures, and improving coordination across organizational units. The outcome is the development of a TO-BE process model, which represents the desired future state of the workflow (Martin, 2006).

c. The implementation phase translates this redesigned model into operational reality. This often requires significant organizational adjustments, including the reallocation of responsibilities, the introduction of new technologies, and the development of employee competencies. Importantly, implementation success depends not only on technical factors but also on change management practices, including communication, training, and stakeholder engagement (Vom Brocke et al., 2014).

d. Finally, the BPM lifecycle emphasizes continuous monitoring and improvement, where process performance is evaluated using key performance indicators such as processing time, throughput, and service quality. This iterative logic ensures that processes remain adaptive to evolving technological and organizational conditions.

Fig1.Business Process Management (BPM) Lifecycle



Source: Elaborated by the author based on the literature review.

In figure 1 (fig1), the BPM lifecycle illustrates the sequential and iterative phases of process management in organizations. It begins with AS-IS Analysis, where current processes are diagnosed to identify inefficiencies. This is followed by Process Evaluation and Redesign, which develops a TO-BE model representing the desired future state. The Implementation phase operationalizes the redesigned processes, involving technology adoption, reallocation of responsibilities, and employee skill development. Finally, Continuous Monitoring and Improvement ensures that processes are tracked using key performance indicators (KPIs) such as processing time, throughput, and service quality, forming a feedback loop that maintains adaptability and performance over time.

3.2. Digital Technologies as Enablers of BPR

While BPR defines "*what"* needs to be transformed, digital technologies determine "*how"* such transformation can be effectively achieved (Kubrak, 2023). However, treating technologies as standalone tools provides only a partial understanding of their impact. Instead, this study conceptualizes digital technologies as bundles of organizational capabilities that influence different stages of the BPR lifecycle.The concept of digital capabilities has evolved significantly in recent years, moving beyond simple technology adoption to encompass organizational competencies in leveraging digital technologies for strategic advantage. Contemporary frameworks distinguish between foundational and advanced digital capabilities, with important implications for transformation outcomes (Atobishi et al.,2024).

Research on digital capabilities in the public sector shows that their impact on organizational performance is significant, with. A study of public officials in Jordan's Ministry of Justice found that capabilities

related to data-driven decision-making, flexible automation, and interactive communication improved efficiency, service quality, and user satisfaction, with agility accounting for a substantial share of these performance gains (Atobishi et al., 2024).The effectiveness of Business Process Reengineering (BPR) depends on the distinction between basic and higher-order digital capabilities. Basic capabilitiessuch as record digitization, online service delivery, and electronic communicationprimarily automate existing processes and enhance accessibility. In contrast, higher-order capabilities, including analytics, predictive modeling, real-time monitoring, and enterprise architecture, enable deeper process redesign and continuous improvement (Charalabidis et al., 2023; Kubrak et al., 2023).Supporting this distinction, a review of digital transformation cases allowed us to identify capability dimensions which underpin key redesign mechanisms such as process integration, automation, and data-driven decision-making (Kubrak et al.,2023). Three interrelated capability dimensions are particularly critical: **analytical, execution, and architectural capabilities**.

a. Analytical capabilities, enabled by Artificial Intelligence (AI) and Big Data Analytics (BDA), enhance decision-making and support process redesign through predictive and data-driven insights. Artificial Intelligence (AI) and machine learning technologies have emerged as powerful tools for enhancing decision-making and automating complex analytical tasks. In the context of BPR, AI can assist organizations during both the analytical and design stages by identifying patterns in large datasets and generating predictive insights that support process optimization. For example, AI-based frameworks applied to Indonesian local government expenditure classification have improved operational efficiency by automating repetitive classification tasks while providing predictive insights that support more effective resource allocation (Riyadi et al., 2023). Such applications demonstrate how AI can contribute to more proactive and data-driven governance practices. Big Data Analytics (BDA) by analyzing large volumes of operational and citizen-generated data, allows governments to identify patterns in service demand, predict future needs, and optimize resource allocation. the use of big data analytics in public administration can significantly improve service responsiveness and operational efficiency while supporting more citizen-centric governance models (Vasilopoulou et al., 2023). Nevertheless, the adoption of BDA also raises challenges related to data privacy, cybersecurity, and the availability of skilled data analysts.

b. Execution capabilities, including Robotic Process Automation (RPA) and web-based systems, facilitate the implementation of

redesigned processes by automating routine tasks and enabling digital service delivery. Robotic Process Automation (RPA) enables organizations to automate routine and rule-based activities, thereby reducing processing time and minimizing the risk of human error. Studies by Juell-Skielse et al. (2022) and Lindgren et al. (2021) highlight how RPA can significantly improve workflow efficiency by increasing processing speed and operational throughput.

Web-based systems also play a fundamental role in supporting modern BPR initiatives by enabling digital service delivery and real-time process monitoring. These platforms allow organizations to integrate multiple stakeholders within a unified digital environment while improving transparency and accessibility for citizens (Charalabidis et al.,2023). Empirical examples demonstrate the impact of such systems. The South African Revenue Service (SARS) e-Filing system enabled electronic tax submissions to increase dramatically from approximately 35,000 to over one million within a 48-hour period (Vyver et al., 2012; Satria et al.,2025). These cases illustrate how digital platforms can significantly enhance service efficiency and accessibility.

Process modeling and simulation tools further support BPR initiatives by enabling organizations to visualize and evaluate alternative workflow designs. business process management notation (BPMN 2.0) has become a widely adopted standard for representing both AS-IS and TO-BE processes in a structured and easily interpretable format (Ammirato et al., 2024).

Simulation techniques, including Discrete Event Simulation (DES), provide organizations with the ability to test alternative process configurations before implementing them in real operational environments. These tools allow analysts to evaluate key performance indicators such as throughput, resource utilization, and service delivery times, thereby supporting evidence-based decision-making (Torri et al., 2015; Leva et al., 2017).

c. architectural capabilities. particularly Enterprise Architecture (EA), provide the structural foundation required for integrating heterogeneous systems and ensuring interoperability across organizational units. Public organizations can design coherent digital infrastructures that support interoperability, knowledge management, and coordinated service delivery across agencies (Aydinli et al., 2009;Akatkin et al., 2019). Addressing issues such as legacy systems and technological fragmentation requires adherence to architectural standards, protocols, and reference models that ensure long-term scalability and sustainability (Martin et al.,2006; Štemberger et al., 2007).

3.3. Capability Alignment and Transformation Outcomes

A critical insight emerging from this analysis is that the impact of digital technologies on BPR outcomes is not determined by their individual adoption, but by their alignment. The three capability dimensions must operate in a coordinated and mutually reinforcing manner to generate meaningful improvements in organizational performance(Sánchez & Martinez, 2024).

When analytical capabilities are developed without corresponding execution mechanisms, organizations generate insights that cannot be operationalized. Conversely, strong execution capabilities without prior analytical and redesign efforts lead to the automation of inefficient processes. Similarly, weak architectural foundations result in system fragmentation, limiting coordination and scalability.

These patterns suggest that digital transformation in public administration is not a linear or technology-driven process, but a systemic and capability-dependent phenomenon. Performance improvements in terms of efficiency, transparency, and service quality emerge only when digital capabilities are coherently aligned with redesigned processes.

4. Digital Administration and Business Process Reengineering in Algeria

The selection of Algeria is theoretically motivated by multiple reasons, First, the Algerian public sector is characterized by bureaucratic rigidity, legacy systems, and centralized governance structures (Slaimi&Ouennes, 2025), making it particularly suitable for examining the challenges associated with implementing BPR in constrained environments. Second, the country is currently undergoing an active digital transformation phase under its national strategy (2025–2030) to reinforce its commitment to digital transformation through an updated national strategy that prioritizes infrastructure development and cybersecurity, encompassing more than 500 digital projects planned for the 2025-2026 period (Digital Policy Alert, 2025). Notably, approximately 75% of these initiatives focus on the modernization of public services, including the development of a flagship interactive national portal for digital services and the establishment of an interoperability platform aimed at centralizing administrative procedures and reducing the need for physical travel (Ministry ofInterior, 2022). Third, civil status services represent a high-impact administrative domain where inefficiencies are both visible and measurable, and where digital reforms have been prioritized. These characteristics position Algeria as a critical case for theory-building, allowing insights that extend beyond the specific context.

4.1. Research Methodology

This study adopts a qualitative case study approach to examine how digital technologies enable Business Process Reengineering (BPR) within public administration, with a specific focus on Algeria. A case study design is particularly appropriate given the complex, context-dependent, and institutionally embedded nature of digital transformation processes in the public sector. This approach allows for an in-depth exploration of how technological, organizational, and regulatory dimensions interact to shape transformation outcomes. Following the principles established byYin(2009) the research is designed as an embedded single-case study, where Algeria constitutes a critical and revelatory case for understanding IT-enabled transformation under conditions of institutional constraint.Despite the practical importance of understanding BPR in developing-country public sectors, we identified that there were no qualitative single-case studies of BPR in Algerian public sector organizations were found. The available Algerian studies focus on private sector ERP implementations (Latreche &Berarma, 2025) or provide high-level overviews of digital transformation opportunities without detailed process-level analysis (Benali et al.,2025).Other studies discuss digital transformation opportunities in Algeria at a macro level, noting institutional quality and regulatory reform as important factors, However, existing research does not provide process-level analyses of BPR, representing a significant gap in the literature. This gap is particularly important because Algeria's institutional and administrative context differs substantially from the Western settings in which most BPR theories were originally developed.This evidence gap creates an urgent need for qualitative case research examining how Algerian public sector organizations navigate the challenges of BPR implementation under institutional constraints.

Data collection relies on multiple qualitative sources to ensure robustness and triangulation. Primary materials include official policy documents, government and international reports, and legal texts related to digital transformation and civil status administration. These are complemented by an analysis of digital platforms and e-government services, focusing on their functionalities, user workflows, and integration mechanisms. Secondary sources, including peer-reviewed academic literature and comparative case studies, are also incorporated to contextualize findings and support theoretical interpretation. This combination of sources enables a comprehensive understanding of both the structural and operational dimensions of transformation.The analysis follows a theory-driven approach, combining pattern matching and explanation building. Empirical observations from the Algerian case are systematically compared with constructs derived from the Resource-Based View.

This allows the study to identify correspondences between observed reforms and different levels of transformation, while also examining how the availability and alignment of digital capabilities influence progression across these levels. Explanation building is then used to develop causal interpretations, linking digital capabilities to process redesign and performance outcomes, while accounting for institutional constraints. The objective is not statistical generalization but analytical generalization, contributing to theory refinement.

4.2. Integrated Digital Capabilities and BPR Outcomes in Algerian Civil Status Services

The findings indicate that the effectiveness of Business Process Reengineering (BPR) in Algerian civil status services is shaped by the interaction of three higher-order capabilities; analytical, execution, and architectural, which collectively determine whether digitalization translates into meaningful transformation outcomes.

a. Architectural Capabilities. Algeria has achieved substantial progress in building foundational digital infrastructure. The legal recognition of electronic documents, by the Executive Decree No. 16-142 further strengthens this transformation by institutionalizing digital processes and supporting BPR objectives such as workflow simplification and reduced administrative redundancy.

The National Automated Civil Status Registry (RNAEC), representing over 56.8 million records and the interconnection of all 1,541 municipalities via fiber-optic networks (Ministry of Interior, 2024). This large-scale integration represents a critical enabler of BPR by supporting data centralization, interoperability, and decentralized service access, allowing citizens to obtain civil status documents regardless of their municipality of origin.

However, despite these advances, architectural capabilities remain incomplete. Interoperability across government sectors, particularly with justice, social services, and consular systems, remains limited, resulting in fragmented workflows and continued reliance on manual data re-entry. This structural limitation explains why BPR outcomes remain largely confined to process-level improvements and not a radical redesign of processes, while network-level and strategic transformation remain weak, as reflected in Algeria's moderate performance in the UN E-Government Development Index EGDI score: 0.5956; rank: 116/193 (UN, 2024). Thus, while infrastructure enables digitization, insufficient architectural integration constrains end-to-end process redesign.

b.Execution Capabilities The effectiveness of architectural investments is ultimately contingent upon execution capabilities, which determine the extent to which digital infrastructures are translated into operational outcomes. From a Resource-Based View

perspective, digital platforms, interoperability frameworks, and identity systems constitute valuable technological resources; however, their impact depends on the state's ability to deploy, integrate, and leverage them through organizational capabilities (Barney, 1991). In parallel, Business Process Reengineering emphasizes the radical redesign of administrative workflows to achieve efficiency, service quality, and citizen-centricity (Hammer & Champy, 1993). The Algerian case illustrates this complementarity, where digital investments are reinforced by process transformation mechanisms.

The large-scale deployment of digital platformsdemonstrates the state's capacity to operationalize digital initiatives at the national level. The E-services Portal pf the Ministry of the Interior enables citizens to submit, track, and retrieve documents remotely, reflecting not only technological adoption but also substantial workflow simplification and automation (Ministry of Interior, Local Authorities & Transports, 2025; Digital Policy Alert, 2025). This aligns with BPR principles by reducing process redundancy and administrative burden while enhancing accessibility.

Similarly, digital appointment platforms introduced by the Ministry of Foreign Affairs restructure service delivery by optimizing scheduling processes, reducing waiting times, and improving user experience, particularly for citizens abroad (Slaimi&Ouennes, 2025). Interagency agreements, such as the collaboration between the Ministry of Foreign Affairs and the national postal service Algérie Poste, further illustrate how execution capabilities extend beyond individual organizations to encompass cross-institutional coordination. These arrangements enable end-to-end digital processing and tracking of legalization requests, highlighting the role of complementary resources and inter-organizational capabilities emphasized by RBV (Ministry of Post and Telecommunications, 2025).

Additional platforms, such as the online lost document declaration system, demonstrate the integration of public safety and administrative services within a unified e-government ecosystem, supporting real-time interaction and service continuity. Moreover, Algeria's biometric national identity system and digital authentication framework represent foundational digital platforms that enable secure access, identity verification, and trusted transactions. While the full integration into a unified digital identity ecosystem remains under development, these systems strengthen the institutional infrastructure required for scalable and secure digital services (Zouaouid, 2025).

Overall, these examples illustrate that digital transformation outcomes in the public sector are not driven solely by the availability

of technological resources, but by the alignment between architectural investments and execution capabilities. This alignment enables the effective reengineering of administrative processes and the creation of sustained public value.

However, execution remains uneven across local municipalities. This disparity is evident in the persistence of hybrid administrative processes, such as the 12-S certificate system, where online requests still require physical collection (Ministry of Interior, 2024). Such gaps indicate that the quality of BPR implementation is constrained by insufficient change management, lack of standardized procedures, and gaps in workforce digital skills (Berkane et al., 2024; Bakir et al., 2024). These challenges confirm that technological deployment alone is insufficient, and that organizational readiness plays a decisive role in translating digital investments into measurable performance improvements.

As a result, digitalization often produces digitized silos, where systems are connected but not fully integrated, limiting transformation at the process level and preventing coordinated, network-wide outcomes (Cram et al., 2019; Janssen et al., 2017).

Human and organizational factorsfurther reduce system utilization, as civil servants frequently maintain parallel manual procedures despite the availability of digital tools. Governance also shapes execution outcomes (Gil-Garcia & Pardo, 2005), while national programs led by the Ministry of Interior demonstrate strong strategic intent, coordination gaps between central authorities and local municipalities result in inconsistent implementation, uneven service quality, and limited scalability. Consequently, execution capabilities act as a critical bottleneck, transforming digital potential into localized rather than system-wide performance improvements (Holzer & Kim, 2006; Mergel, 2016).

c. Analytical capabilities: At a higher level, analytical capabilities remain the weakest and least developed dimension, significantly constraining the sustainability of BPR outcomes. Despite the availability of large-scale administrative datasets, according to the national office of statisticsincluding approximately 895,000 births, 192,000 deaths, and 278,000 marriages annually (NOS, 2023) these data are not systematically leveraged for decision-making, performance monitoring, or process optimization. Civil status systems function primarily as data storage platforms rather than analytical tools, with limited use of dashboards, predictive analytics, or evidence-based management practices(Saada, 2024; Diafi et al., 2024. Benali et al.,2025). This gap is particularly critical because analytical capabilities are essential for moving from static digitization to a dynamicdata-driven governance (Ooi et al., 2025).

Comparative evidence demonstrates that big data and analytics capability is often the strongest predictor of improvements in efficiency and transparency (Atobishi et al.,2024). In the Algerian context, the absence of such capabilities explains why digital transformation has produced initial efficiency gains such as reduced processing times and improved accessibility but has not yet achieved continuous improvement or adaptive service delivery.

Importantly, the interaction between these capabilities is strongly influenced by institutional and structural constraints, which moderate their impact on BPR outcomes. While Algeria has achieved full territorial coverage in terms of infrastructure by 100% municipal connectivity, significant disparities persist in terms of digital access and usage. Internet penetration reaches approximately 72% in urban areas but only 43% in rural regions, creating a 29% digital divide (Data Reportal, 2024), limiting the effectiveness of fully digital service delivery. These disparities demonstrate that infrastructure availability does not guarantee effective usage, reinforcing the moderating role of socio-economic and territorial factors.

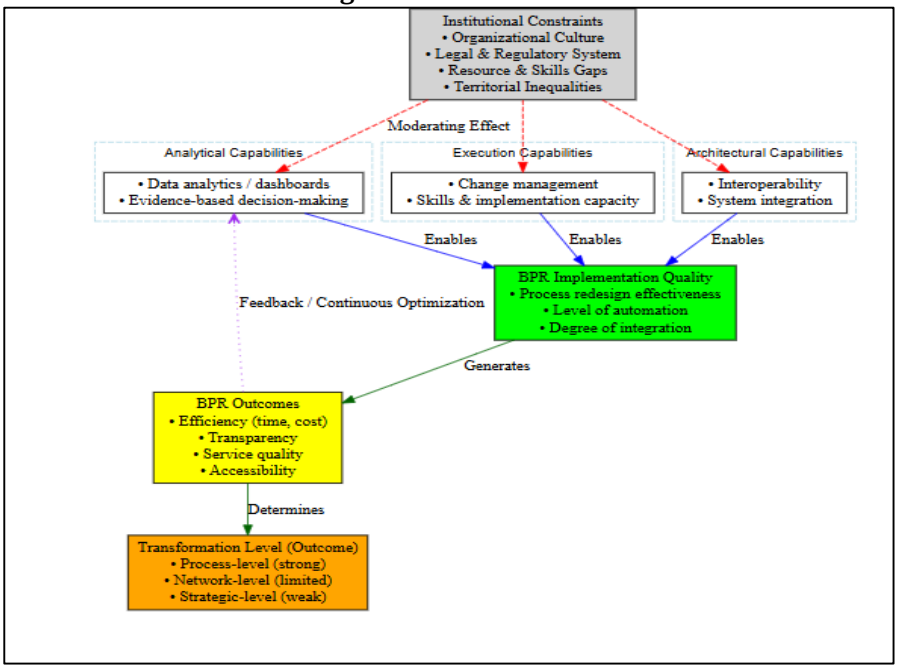
Furthermore, institutional constraintsincluding incomplete legal frameworks for digital identity, regulatory rigidity, and fragmented governance structureslimit cross-agency coordination and hinder the scalability of digital initiatives (Bouhafs, 2025).

To synthesize the empirical findings and explicitly align them with the proposed framework, figure 02 presents a consolidated analytical view of how each capability dimension translates into specific implementation effects and transformation levels. This integrative representation allows for clearer identification of causal mechanisms, capability gaps, and moderating constraints, thereby reinforcing the explanatory power of the framework.

Taken together, these findings reveal a structural misalignment between digital capabilities in the Algerian public sector. Architectural capabilities provide a strong foundation for data centralization, execution capabilities enable partial implementation of digital services, but weak analytical capabilities prevent continuous optimization and strategic transformation. This imbalance explains why digital transformation outcomes remain partial and characterized by hybrid processes, fragmented systems, and territorial inequalities in service delivery.

In line with the Resource-Based View, this case demonstrates that operational capabilities such as digitization, platforms, infrastructure enable initial efficiency gains, but the three types of dynamic capabilities determine the depth, sustainability, and systemic impact of BPR. Without their alignment, digital transformation remains superficialimproving access and speed without achieving fully integrated, data-driven governance.

Fig 2. Digital Capabilities, Constraints, and BPR Outcomes in Algerian Civil Status.



Source: Elaborated by the Author according to the empirical analysis.

figure 2 (fig2) highlights a clear capability hierarchy effect. Execution capabilities primarily influence theimplementation of BPR, determining whether redesigned processes are effectively adopted at the operational level. However, their uneven distribution across municipalities results in hybrid service models and inconsistent performance outcomes (Zouaouid, 2025).Architectural capabilities, while relatively strong in terms of infrastructure and connectivity, remain limited in terms of interoperability, this leads to fragmented workflows and prevents the transition from process-level improvements to network-level integration (Benaouda, 2024; Slaimi et al., 2024).In contrast, analytical capabilities emerge as the most critical missing dimension. Despite the availability of large-scale administrative data, their limited use for performance monitoring and decision-making constrains continuous process optimization.

Importantly, our study also demonstrates the systematic moderating role of institutional constraints, particularly territorial inequalities, legal rigidity, and resource limitations. These factors weaken the translation of digital capabilities into effective BPR outcomes, resulting in uneven service accessibility and geographically differentiated performance.

Taken together, these results empirically validate the conceptual framework by demonstrating that misalignment between capabilitiescombined with strong institutional constraintsproduces partial and asymmetric transformation outcomes, characterized by strong process-level gains but limited network and strategic transformation.

5. Theoretical Contribution

This study contributes to the literature on digital transformation and BusinessProcess Reengineering in several ways.

First, it extends RBV by demonstrating that digital resources alone do not generate performance outcomes in the public sector. Instead, higher-order capabilities, analytical, execution, and architecturalact as critical conversion mechanisms that translate digital investments into effective BPR outcomes.

Second, the study advances BPR theory by showing that process redesign is inherently capability-dependent. The findings challenge linear and technology-centric perspectives by demonstrating that the success of BPR is conditional upon execution quality and architectural integration.

Third, the research contributes to digital government literature by introducing a multi-level perspective on transformation. The Algerian case reveals that digital transformation is fragmented rather than sequential, with strong process-level improvements but limited progress at network and strategic levels.

Fourth, the study integrates RBV with an institutional perspective, showing that digital capabilities are embedded within regulatory, organizational, and territorial contexts that shape their effectiveness.

Finally, the study provides empirical insights from an under-researched context, offering one of the first structured analyses of capability-driven digital transformation in Algerian public administration.

6. Managerial and Policy Implications

The findings of this study provide several important implications for policymakers and public sector managers seeking to enhance digital transformation and BPR effectiveness in Algeria.

First, investment priorities must shift from technology acquisition to capability development**.** While Algeria has made significant progress in deploying digital infrastructure, the results show that execution and analytical capabilities remain weak**,** limiting the impact of these investments. Policymakers should prioritize training, change management, and digital skills development**,** particularly at the municipal level where implementation gaps are most pronounced.

Second, strengthening architectural capabilities should be a strategic priority. The persistence of fragmented systems and limited interoperability indicates the need for standardized data formats,

integration protocols, and enterprise architecture governance. Without these, digital initiatives will continue to produce isolated improvements rather than system-wide transformation**.**

Third, the study highlights the importance of data-driven governance, public institutions should move beyond data collection toward active use of analytics, including performance dashboards, predictive tools, and monitoring systems. This would enable continuous process improvement and support evidence-based decision-making**,** which is currently lacking.

Fourth, legal and regulatory reforms are essential to unlock the full potential of digital transformation. Updating frameworks related to digital signatures, data sharing, and electronic records is necessary to eliminate reliance on legacy procedures and enable fully digital workflows.

Fifth, addressing territorial disparities is critical for equitable transformation. Policymakers must ensure that investments in infrastructure are complemented by local capacity building**,** particularly in rural areas, to avoid reinforcing inequalities in service access and quality.

Finally, the findings suggest that digital transformation should be approached as a holistic reform process**,** rather than a purely technical initiative. Success requires alignment between technology, human capital, organizational structures, and institutional frameworks**.** Without this alignment, digitalization risks remaining superficial, producing efficiency gains in isolated areas while failing to achieve systemic change.

7. Conclusion

This study examined the role of digital capabilities in shaping Business Process Reengineering (BPR) outcomes within Algerian civil status services. The analysis highlights that while digital transformation has produced measurable improvements, such as reduced processing times, enhanced accessibility, and improved transparencythese gains are uneven and largely confined to process-level changes. The effectiveness and sustainability of BPR initiatives depend not only on technology deployment but critically on the alignment of higher-order capabilities: analytical, execution, and architectural.

Analytical capabilities, including data-driven decision-making, performance monitoring, and predictive analytics, remain underdeveloped, limiting the potential for continuous process optimization. Execution capabilities, comprising workforce digital skills, change management, and leadership commitmentare uneven across municipalities, resulting in partial adoption of redesigned processes. Architectural capabilities, such as interoperability and

integrated digital infrastructure, are essential for cross-agency coordination but remain fragmented, constraining end-to-end service delivery.

Institutional and structural factors, including legal frameworks, organizational culture, resource limitations, and territorial disparitiesfurther moderate the impact of digital capabilities, producing localized rather than systemic transformation. Consequently, digitalization in Algerian civil status services often results in digitized silos, where technological adoption does not automatically translate into fully integrated, citizen-centric processes.

The study contributes theoretically by integrating the Resource-Based View with institutional perspectives, demonstrating that digital capabilities function as value-creating mechanisms only when embedded within supportive organizational and regulatory contexts. From a practical standpoint, findings suggest that sustainable BPR outcomes require coordinated investments in human, organizational, and technological capabilities, coupled with legal modernization and equitable infrastructure development across regions.

In conclusion, achieving comprehensive, citizen-focused digital transformation in Algerian public administration requires a holistic approach that moves beyond technology deployment to strategically align capabilities, processes, and institutions.

Future Research Directions

Future research should prioritize empirical measurement of higher-order digital capabilities and their direct impact on BPR outcomes in public administration. Quantitative studies could operationalize analytical, execution, and architectural capabilities and test their effects on efficiency, transparency, and service quality.

Longitudinal research is needed to examine how capability development influences transformation over time, while comparative studies across municipalities or sectors could identify context-specific enablers and constraints.

In addition, experimental and quasi-experimental designs would be particularly valuable in establishing causal relationships between capability investments and performance outcomes.

Finally, further research should explore the interaction between capabilities and institutional factorssuch as governance structures, legal frameworks, and organizational cultureto better understand how digital transformation can be scaled and sustained in developing country contexts.

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