



Does Project Management Information System Influence the Operational Performance of Public Information Systems Departments in the Moroccan Public Sector?

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Abstract

The operational performance of the Information System Departments (ISDs) of Moroccan Ministries is central to the effectiveness and efficiency of digitalized public services. Based on this premise, the Project Management Information System (PMIS) emerges as a key tool for optimizing the planning, execution, and evaluation of IT projects within public ISDs. This conceptual study explores the theoretical framework linking PMIS to operational performance in public ISDs, highlighting the role of this system in the overall success of IT projects. Through a synthetic review of project management literature and public-sector IT governance frameworks, we examine how PMIS contributes to evaluating operational performance through specific indicators such as project delivery time, budget adherence, resource utilization, and stakeholder satisfaction. Our analysis reveals that PMIS enhances performance primarily through improved coordination mechanisms, real-time monitoring capabilities, and data-driven decision-making processes. The study also identifies implementation challenges, including integration complexity, resistance to change, and data security concerns. We conclude that successful PMIS adoption in Moroccan public ISDs requires a phased implementation approach, stakeholder engagement strategies, and robust training programs, recommendations that offer practical guidance for public-sector digital transformation initiatives.

Keywords: Project Management, Project Management Information System, Operational Performance, IT Projects, Public Sector

1. Introduction

Most countries have a national digital government strategy, as well as legislation on cybersecurity, personal data protection, national data policy, government data openness and e-participation (Benkada, 2024). In the case of the Kingdom of Morocco, the public sector has clearly understood the shift from digital transformation as a luxury to a necessity, by putting in place Information Systems Departments (ISD) as structures responsible for digital transformation.

The information systems departments of Moroccan ministries are the entities responsible for the digital transformation of the processes and procedures of their internal departments and, equally, of the institutions under their supervision. Several Ministries have taken their first steps in digital transformation, whether by creating an ISD, like the Ministry of Justice, or a Division, like the Ministry of Health and Social Protection. When one leads, the others follow, and the other Ministries have integrated the said entity, culminating in the creation of a Ministry in charge of Digital Transition and Administration Reform under the wings of the Thirty-third Moroccan Government from 2021.

To illustrate these dynamics in concrete terms, let's examine two examples from the Moroccan context that highlight contrasts in how projects are managed. The Directorate of Modernization and Information Systems was established by the Ministry of Justice (MoJ) in 2011 by Decree No. 310-10-2. Since then, the MoJ has launched several information systems for the electronic management of court cases involving litigants (e.g., the electronic civil case management system (S@J-C), which consists of 35 modules, developed entirely in-house, and whose design, development, and rollout required a five-year timeframe), offering online services to the general public (e.g., the platform for submitting and processing applications for Moroccan citizenship certificates, launched in 2024; this project, developed entirely in-house, required two years of design and development) and integrating legal and judicial professionals into the justice system (e.g., the national electronic registry of real estate liens, launched in March 2020; this project spanned three years with a budget of several million dollars)¹. MNTAR (Ministry of Digital Transition and Public Administration Reform), created in 2021, manages the Digital Morocco 2030 strategy with centralized portfolio management across different sectoral digital initiatives. This strategy represents a public investment of roughly 11 billion dirhams (~ USD 1.1 billion) from 2024-2026 and aims to help accelerate public service digitization, directly create 240,000 new jobs by 2030, and improve Morocco's rank in the United Nations E-Government Development Index from 113 to among the top 50 in the world. To achieve these ambitious goals, coordinated governance as well as project portfolio oversight must be utilized by the government to ensure proper prioritization and execution of large-scale public IT projects.

As with both examples, both agencies are having difficulty establishing performance measurement systems, since although they record timelines for each project internally, they have no standardized methodology for sharing this information and therefore cannot benchmark their performance against similar projects or agencies. This reinforces the need for a framework as outlined in this paper.

Examples of international governing bodies also influence how this measurement challenge is managed. For example, ISO/IEC 38500:2015 provides principles to guide the effective governance of IT and COBIT 2019 (ISACA, 2019) offers a comprehensive framework for managing enterprise IT in alignment with the organization's goals. Specifically, the OECD Digital Government Policy Framework (OECD, 2020) establishes six dimensions of digital maturity and these include, for example, the need for a digital-by-design and data-driven public sector, thus directly influencing how ISDs implement their operations and measures of performance.

In this article, we will discuss the contribution of PMIS to operational performance of public ISDs, introducing the evaluation of said performance via PMIS, by answering the following question: what contribution does PMIS make to improving the operational performance of public-sector ISDs, and how can it measure it? To answer this question, we will present the

¹ Source: Internal documentation for tracking IT projects at the Ministry of Justice.

Conceptual Framework of Operational Performance of Public Sector ISDs, then study the role of PMIS as a key tool for public sector ISDs, and finally analyze the Contribution of PMIS to the evaluation of operational performance of public sector ISDs and its Limitations and Perspectives.

The existing literatures have been analyzed in this paper using the structured synthetic review method guided by the principles of PRISMA (Page et al., 2021). The systematic search has been conducted from January 2020 to June 2025 from four databases (Web of Science, Scopus, Google Scholar, and SSRN) using the search string ("PMIS" OR "Project Management Information System") AND ("operational performance" OR "IT governance" OR "public sector") AND ("e-government" OR "digital transformation" OR "information systems department"). This visible search has yielded 450 records and through deduplication, the identified 320 records have been examined, 245 of which have been excluded as they lack relevance to PMIS, operational performance, and public sector governance. In the end, 75 documents were subject to reading and 28 papers were shortlisted for final synthesis (Figure 1 includes a PRISMA-style flow diagram).

Screening took place in two consecutive stages according to a set of procedures, which ensured precision and lowered the chances of choosing. During the initial stage, the main author conducted a screening process for the headings and abstracts of all 320 records that had already been sorted out according to inclusion and exclusion criteria presented below. In order to check the correctness of this process, another author screened a random 20% of the records (n=64), and the two authors had a significant similarity in opinions regarding the results of the analysis, while any disagreements have been discussed, with the involvement of a third author. The first stage resulted in the choice of 75 publications for a full reading. The next stage involved a full analysis of the texts of these publications performed by the main researcher applying the same edition criteria along with the quality assessment table presented in Table 1. In the second part of the analysis only those records scoring at least 6 out of 9 were accepted, and yet another author conducted an independent review of the scores given to publications that have scores below 7. The whole process led to a choice of 28 papers for further analysis. The use of a partially duplicative approach is a deliberate compromise made by the team given the availability of resources.

The inclusion criteria comprise of: (i) peer-reviewed papers, proceedings from conferences, and institutional reports; (ii) documents published from 2020 to 2025, enduring the retention of earlier seminal works; (iii) papers dealing with PMIS, IT governance, or measuring digital/e-Government performance. The exclusion criteria comprise of: (i) blogs that are not peer-reviewed and contents not published in recognized institutional web-sites (OECD, World Bank, National Digital Agencies); (ii) research lacking any measurable relation to the concepts of performance or governance; (iii) duplicate or non-English/French literature without other translated versions.

The quality of the literature found was evaluated by employing the relevance/credibility scoring grid based on three components, source/s authority (involving institutional peer-review ranking for published documents), transparency of the methods applied and relevance to IT public sector, each rated from 1 to 3 with the minimal cumulative score of 6 out of 9 (see Table 1). The literature review has been based on four complementary perspectives.

Table 1: PMIS KPIs mapped to a Balanced Scorecard logic model for public ISDs

Criterion	Score 1 (Low)	Score 2 (Moderate)	Score 3 (High)
Source authority	Non-peer-reviewed content; unranked or non-institutional publisher	Peer-reviewed article in a lesser-indexed journal, or report from a national/sectoral institution	Peer-reviewed article in a Scopus/WoS-indexed journal, or report from a recognized international body (OECD, World Bank, PMI, ISO)
Methodological transparency	Method not described, or purely opinion-based/anecdotal content	Method partially described (e.g., data source stated but sampling/analysis not detailed)	Method fully described (sample, data collection, and analysis procedure clearly stated and reproducible)
Relevance to public-sector IT context	Addresses PMIS/performance/governance only tangentially, with no public-sector or IT-project link	Addresses PMIS, IT governance, or performance measurement, but outside a public-sector setting (e.g., private industry)	Directly addresses PMIS, IT governance, or e-government/digital-transformation performance within a public-sector setting

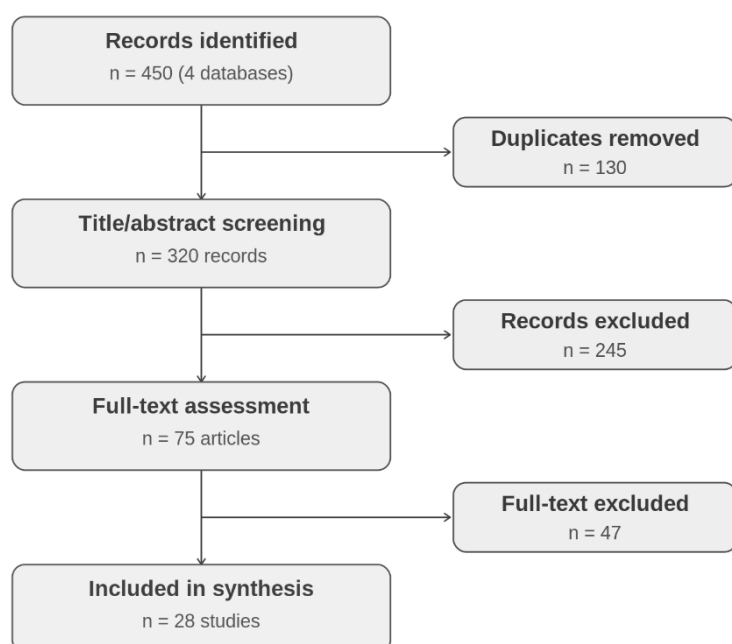


Figure 1: PRISMA-style flow diagram

2. Operational Performance of Public ISDs: Conceptual Framework

In this first part, we will present a summary literature review of the notion of operational performance, while framing its definition and the multiple challenges it faces in an IT environment equipped with the specificities of the public sector, to end with the various indicators for monitoring and steering operational performance in public ISDs.

2.1 Definition of Operational Performance

Performance as a concept has been used broadly to refer to organizational, individual, team or a unit's qualitative and quantitative results of work (Wanyama et al., 2022). Operational

performance is based primarily on the reliability, speed, quality and efficiency of an organization's process outputs, which in turn impact performance measures such as customer satisfaction (Azim et al., 2010). Wangila and Mucheule (2019) noted that operational performance seeks to assess management efficiency and reduce management costs. Indeed, like other business metrics, Hamal and Tyagi (2023) argued that operational performance indicators differ from one organization to another depending on their areas of activity. For example, MacDuffie (1995) used the notions of productivity and quality to measure operational performance, while Hamal & Tyagi (2023) used product/service quality, new product development and customer satisfaction.

Based on this definition, an important methodological challenge arises, as ISD performance is inherently dependent on the collaboration of many parties (users, political bodies, suppliers, and the public), and many results arise after considerable delay.

Since the emergence of New Public Management (Hood, 1995), measuring performance has become an important part of public administration, based on private-sector principles, taking the private-sector principle of measurement to public institutions that also provide goods and services that are measurable (Assou & Chemlal, 2021), such as the number of patients being treated in the hospital or the number of projects delivered by ISD. However, this analogy has its boundaries, as public services are quite varied and based on many actors, thus one indicator rarely tells the whole story (Arnaboldi & Azzone, 2010; Jarrar & Schiuma, 2007). For example, the success of a hospital can be dependent on numerous things apart from the number of patients treated. Therefore, measuring the performance of ISD is more than just establishing goals and comparing results to the goals, as it depends on many parties and the long-term influence of their actions, along with political changes that complicate evaluation.

2.2 Challenges Facing Public Sector IT Departments

Public-sector ISDs face several unique structural challenges, such as: limited resources and budgets, vague roles and responsibilities, pressure from heavy workloads, limited opportunities for professional development, and difficulty in dealing with new technologies such as artificial intelligence (Dunleavy et al., 2006). In addition to this, while IT teams in the public sector have to face somewhat complex regulations regarding their work, they also face new security threats unlike their private sector counterparts.

Over and above these challenges, a major challenge lies in the ability of these departments to demonstrate their impact and added value for the ministerial departments to which they belong. It is in this context that the question of measuring operational performance becomes crucial. Indeed, assessing the effectiveness and efficiency of ISDs not only enables us to better guide digital strategies, but also to justify investments and continuously improve the quality of services offered to users, be they institutional partners or citizens.

2.3 Traditional performance indicators

The difficulty IT managers have in demonstrating that the resources they devote to planning, developing, implementing and operating IT projects (or computerized information systems) deliver a tangible return on investment, has led them to frequently ask a number of questions about the need to invest in IT, the added value of an implemented IT application, and the productivity of ISDs (Melville et al., 2004). Measuring the value of IT and evaluating the performance of information systems is therefore of great importance to managers.

According to the report published jointly by Cigref, the network of major French companies, and the National Association of Financial and Management Control Directors in June 2023,

analyzing and proposing approaches for assessing ISDs performance, Measuring ISDs performance obviously includes financial performance, but also non-financial performance, since the added value provided by the ISDs and the Information Systems can be translated into financial KPIs, but also into a more intangible but nonetheless non-negligible contribution. Thus, in a context of IS departments characterized by both a hierarchical and a project-based structure, the Project Management Information System (PMIS) seems to us to be the element capable of adding value and measuring the operational performance of these departments, and those given its panoramic visibility over the operational performance of these departments.

3. PMIS: A key Tool for Public IT Departments

In this section, we'll explore the concept of Project Management Information Systems (PMIS), covering their definition and main functionalities, before analyzing the specific benefits they bring to public ISDs in terms of performance, decision-making and resource optimization.

3.1 PMIS definition and functionalities

Jaafari and Manivong (Jaafari & Manivong, 1998) mentioned in their scientific paper entitled "Towards a smart project management information system" that a project management information system is a system that supports and facilitates the realization of any project, especially those that are complex, subject to uncertainty, subject to market, time and money pressures, or otherwise difficult to manage. The main requirements of a PMIS should be, according to both authors, as follows: Management and control, in real time, of key information provided to project teams, integrating information throughout the project lifecycle, Processing and reporting capabilities, Facilitating proactivity and PMIS interoperability and compatibility.

A PMIS is defined by The Project Management Institute (PMI, 2021) in the seventh edition of the PMBOK Guide as a consolidated group of automated tools that are integrated within project management systems and are now structured using a principled approach instead of a process-oriented method. This change emphasizes value added delivery and adaptive performance domains rather than a focus on the process. Additionally, PRINCE2 (AXELOS, 2017) describes PMIS as a primary element of its management by stages approach to project management providing for ongoing, systematic progress tracking and exception reporting. ISO 21502:2020 (ISO, 2020) elaborates specific guidance regarding the flow of information about a project as part of project governance through project management information systems. All three frameworks have the same view that PMIS should be used throughout the project lifecycle to enable real-time collection of data; provide visibility into portfolios; provide project stakeholders with access to reporting and review; and assist the organization in achieving its project objectives.

It is necessary to differentiate PMIS from adjacent tool classification. Unlike IT service management systems (ITSM), which manage the lifecycle of IT services (incidents, changes, problems) after implementation, PMIS is focused on the planning and execution of projects. In addition, while Business Intelligence (BI) tools collate and visualize enterprise-wide data, PMIS is focused on project and portfolio data.

Within this concept, simple freeware applications are possible, system-level cloud solutions, large complex applications developed by small local software houses, complex user-level applications at international level, sophisticated solutions with rich functionality and user-level configuration capabilities. In addition, PMIS enables project data to be centralized, providing unified, secure access to essential project information. It also facilitates planning by structuring the order of tasks, the allocation of resources and the monitoring of deadlines to ensure optimal project management. And thanks to its monitoring tools, it tracks project progress in real time

and identifies deviations. Finally, its reporting functions generate precise analyses for informed decision-making.

3.2 Role of PMIS in Public IT Departments

The benefits of a PMIS are numerous. Harvey A. Levine (Levine, 2005) asserts that Strategic Portfolio Management allows organizations in the public sector to align projects with their overall strategic goals while maximizing both financial and human resources. Additionally, Norman P. Archer et Fereidoun Ghasemzadeh (Archer & Ghasemzadeh, 1999) contend that Project Portfolio Management provides a structured approach to the decision-making process to identify, rank, and control projects based on the value they bring to the organization and how much they will require in terms of resources. To illustrate this point, Ines Mergel, Noella Edelmann and Nathalie Haug. (Mergel et al., 2019) contend that digital transformation has become a strategic priority for public sector organizations, and therefore, managers in these organizations need effective project management practices to modernize the delivery of public services, increase efficiency and optimize the use of available resources.

The normative interpretation put forward above is supported by the findings of the recent empirical studies. Mutwiri and Muchelule (2022) explore the PMIS integration in public construction projects in Kenya and conclude that adoption of structured PMIS has a direct correlation with better project performance and advocate its usage in other public infrastructure projects. Likewise, according to Haloul et al. (2024), a systematic review supports effectiveness of PMIS in enhancing the managers' satisfaction and usefulness perceptions, although the positive impact depends a lot on preparedness of the organization for this change, which is particularly important in the context of the Moroccan public sector discussed later. United Nations DESA (2024) analysis based on the comparison of e-government indicators indicates that Morocco is ranked among the 50 leading countries and 11th in Africa by the E-Government Development Index, along with Tunisia, Egypt, and South Africa; even though it could do better with the help of strong internal performance systems.

4. Contribution of the PMIS to Operational Performance Evaluation

In this third part, we examine the contribution of PMIS to the operational performance of public ISDs by analyzing the specific mechanisms through which PMIS enables performance evaluation and improvement. Our synthetic review reveals that PMIS contributes to operational performance through three interconnected mechanisms: (1) improved coordination mechanisms that align cross-functional teams and resources, (2) real-time monitoring capabilities that enable proactive decision-making and early risk detection, and (3) data-driven decision-making processes that support evidence-based project management. We will study the indicators, tools, and methods that enable operational performance to be measured through these mechanisms, demonstrating how PMIS transforms performance assessment in public ISDs.

4.1 Operational Performance Indicators Measurable via the PMIS

To measure and evaluate the operational performance of public ISDs, PMIS refers to specific Key Performance Indicators (KPIs). These KPIs provide quantifiable metrics and measurable data to assess operational results and compare them with targets. Some common examples of operational performance KPIs include on-time performance, on-budget performance and progress rates for IT projects (research, design, development, testing, etc.), as well as incident resolution rates and stakeholder satisfaction. Using these indicators, ISDs can monitor and evaluate their operational performance via PMIS, identify areas for improvement and take corrective action to optimize their activities and achieve their objectives.

Project managers sometimes have to manage projects that appear to be sufficiently large to be completed on time (Time Criteria) and manage the funding (Money Criteria), which must be in line with the allocated budget (Mulcahy, 2002). They must also ensure that the project contributes to the ISD's overall strategy (Strategy Criteria) or to user satisfaction. Others consider effective communication, enhanced collaboration and stakeholder commitment (Team Criteria) as success criteria (Retnowardhani & Suroso, 2019). Mulcahy's survey identified success criteria, which will guarantee an improvement in the operative performance of ISDs, based on a multi-level framework for IT project success.

Mapping KPIs to the BSC framework, Kaplan and Norton (1996) established a structured logical performance attribution model. Table 2 displays the mapped KPIs across the four BSC perspectives as adapted for Public ISDs.

Table 2: PMIS KPIs mapped to a Balanced Scorecard logic model for public ISDs

BSC Perspective	KPI	Formula	Data Source	Target	PMIS Measurement Mechanism	Attribution Challenge
Financial	Budget adherence, cost variance	$(\text{Actual budget} - \text{Planned budget}) / \text{Planned budget} \times 100$	PMIS financial module / Earned Value Management	Variance $\leq 10\%$	Earned Value Management	Shared budgets across ministries
Internal Processes	On-time delivery rate, % milestones met	$\text{Number of milestones delivered on time} / \text{Total number of milestones} \times 100$	Gantt / PMIS dashboard	$\geq 85\%$	Gantt tracking, milestone dashboards	Multi-vendor dependencies
Learning & Growth	Staff PMIS adoption rate, training hours	$\text{Number of monthly active users} / \text{Number of target users} \times 100$	PMIS usage logs	$\geq 80\%$ after 12 months	Usage analytics	Lagged impact (6–18 months)
Stakeholder/Citizen	User satisfaction index, service availability	Average survey score (1–5 scale)	Quarterly satisfaction surveys	$\geq 4/5$	Satisfaction surveys, SLA monitoring	Multi-stakeholder co-production

Building on this classification, Figure 2 synthesizes these criteria and illustrates their interrelationships within the operational performance framework.

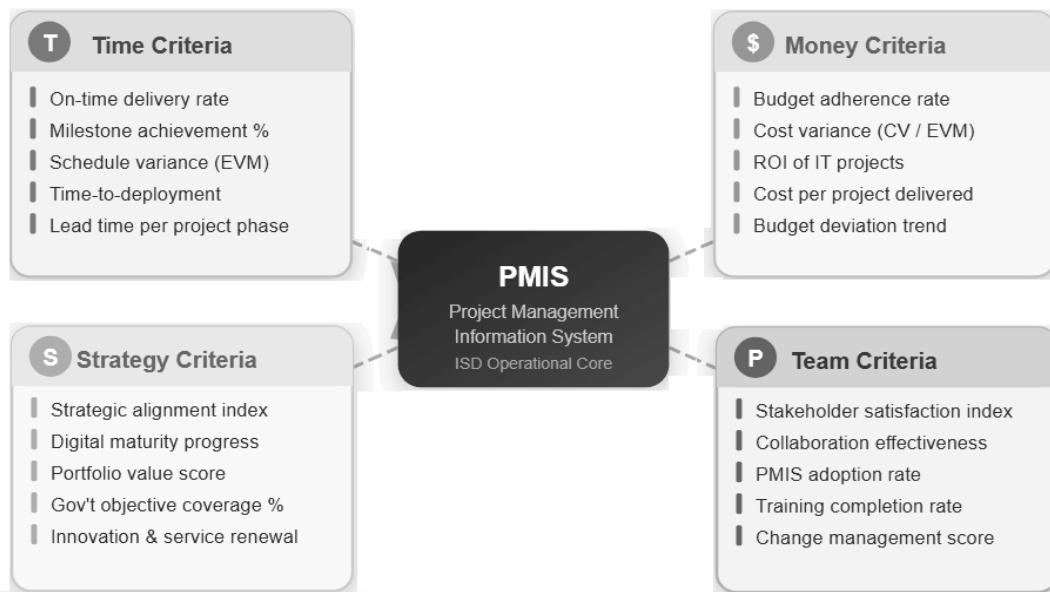


Figure 2: PMIS Criteria Contributing to the Operational Performance of Public ISDs

Source: Author's, based on Mulcahy (2002), Kaplan & Norton (1996), and PMI PMBOK Guide 7th ed. (2021)

4.2 Testable Conceptual Model

The mechanisms and antecedents mentioned above highlight the expected impact of PMIS on operational performance; however, they appear to be more of a descriptive nature. To develop a testable conceptual model, this synthetic review synthesizes the relations found in the literature into three propositions, establishing connections between PMIS implementation and its antecedents and consequences in terms of operational performance in public ISDs:

- P1: PMIS implementation positively influences on-time and on-budget delivery in public ISDs;
- P2: PMIS impact on operational performance is moderated by organizational preparedness (readiness for change, training);
- P3: Real-time monitoring capability of PMIS mediates the relationship between coordination mechanisms and stakeholder satisfaction.

The propositions put forward PMIS implementation as an independent variable, operational performance in terms of delivery time, budget adherence, and stakeholder satisfaction as a dependent variable, and organizational preparedness and monitoring capability, respectively, as a moderator and mediator. Figure 2 exhibits these proposed relationships. Despite the fact that this conceptual study does not test the propositions empirically, they are a methodological foundation for the implementation of quantitative or mixed method research within public ISDs in Morocco.

4.3 Methods and Tools for Assessing Operational Performance via PMIS

The performance of a public administration depends on the factors that generate good results (Bindguigne & Akhlaffou, 2024). In the case of public sector ISDs, which are responsible for driving the digital transition of the ministerial departments to which they belong with a portfolio of IT projects, operational performance depends on the performance of each of their IT projects.

To assess the operational performance of public ISDs, the adoption of the PMIS is a strategic lever, as it enables the efficiency of IT processes to be measured, analyzed and optimized. Indeed, the use of key performance indicators (KPIs) within a structured framework such as the Balanced Scorecard (BSC) is essential to ensure relevant monitoring of activities (Kaplan and Norton, 1996). These KPIs must include the management of IT resources, the availability of digital services and the alignment of IT projects with government strategic objectives (Bouckaert & Halligan, 2008). Thus, a well-designed PMIS must capture accurate, real-time data to facilitate decision-making and continuous improvement in the performance of public ISDs.

Methods for assessing the operational performance of public ISDs via PMIS are based on several complementary approaches. The BSC, is a benchmark approach for assessing performance from a number of perspectives: financial, internal processes, innovation and user satisfaction. In addition, the Information Technology Infrastructure Library (ITIL) framework enables rigorous management of IT services by standardizing incident, problem and change management processes (Hochstein et al., 2005). Another approach is based on benchmarking, which involves comparing the operational performance of public IT departments with best practices in the private sector or other public administrations (Van Helden & Tillema, 2005). These methods are often reinforced by advanced analytical tools integrated into the PMIS, such as dynamic dashboards, which make it easier to visualize trends and identify areas for improvement (Parmenter, 2015).

The integration of technological tools in the evaluation of the operational performance of public ISDs is a lever for improving the efficiency of IT projects. Modern PMIS platforms are based on Business Intelligence solutions, which enable data from IT operations to be used to improve decision-making (Turban et al., 2011). The automation of operational performance reports, supported by artificial intelligence and machine learning, will enable anomalies to be detected and malfunctions to be anticipated, thus optimizing the proactive management of IT resources (Brynjolfsson & McAfee, 2014). In addition, IT service management software, such as ServiceNow or Free Software Asset Manager and many others, play a key role in collecting and analyzing operational performance indicators in real time (Marrone & Kolbe, 2011). These tools ensure better traceability of actions carried out by ISDs and guarantee compliance with public governance standards, reinforcing the transparency and efficiency of IT projects.

Last but not least, the use of PMIS data must be accompanied by effective governance to ensure that decisions are as close as possible to being accurate. Pollitt and Bouckaert (2011) clarified that setting up steering committees makes it possible to analyze evaluation results and propose appropriate action plans. In addition, ongoing training of IT project teams is essential to maximize the effectiveness of the PMIS and ensure proper appropriation of evaluation tools and methods (Fernandez & Rainey, 2006). By integrating these best practices, public ISDs can improve their ability to meet the modernization requirements of the ministerial departments to which they belong, while optimizing the management of digital resources and services.

An example of how these tools and techniques translate into the real world is shown with the example performance dashboard of a PMIS developed for an ISD in a Moroccan ministry. This type of effective Dashboard visually represents at a very minimum the following metric panels: 1. Portfolio Overview (the total number of active/completed/delayed is represented by directorate); 2. Budget Tracker (tracking EVM earned value over time) by graphical representation of budget versus actual spent; 3. Timeline Monitor (percentage of on time/delayed milestones) with graphic traffic lights; 4. Resource Utilization (the heat map indicating how IT resources are utilised at project level); 5. Stakeholder Satisfaction

(aggregated score of satisfaction from internal ministry clients/end-users). This type of dashboard if incorporated into a project management application such as Microsoft Project Online or an open source alternative designed for compliance with CNDP data protection policy would generate the necessary real-time visibility to support evidence-based management of a portfolio of public sector IT/IS projects (Parmenter, 2015; Turban et al., 2011). Figure 3 illustrates the dashboard concept, showing how the five metric panels described above would be organized in practice.



Figure 3: Illustrative PMIS Performance Dashboard for a Public ISD

5. Limits and prospects

5.1 PMIS limitations

However, despite the obvious benefits of PMIS for improving the operational performance of public ISDs, our synthetic review identifies several critical implementation challenges that limit their full potential. First, integration complexity arises from the lack of flexibility of standardized project management frameworks built into many PMIS solutions. Most frameworks cannot be easily adapted to existing regulatory and organizational constraints, particularly in the public sector. Additionally, widespread problems of integration with existing IT infrastructure persist, as many public ISDs rely on obsolete legacy systems that can hardly be fully integrated with modern PMIS solutions. This creates data silos that eliminate most of the expected benefits from improved project tracking, reporting, and resource management.

Second, resistance to change represents another critical limitation of PMIS in public ISDs. The effectiveness of PMIS relies heavily on user adoption and the accuracy, timeliness, and completeness of data entered. However, inconsistencies in data entry, the absence of standardized reporting mechanisms, and staff resistance to adopting new workflows often reduce the system's effectiveness. Third, data security concerns are particularly pronounced in the public sector, where sensitive government data must be managed securely. Cybersecurity and data confidentiality issues, combined with inadequate security measures within some PMIS solutions, can expose public administrations to cyber threats and compliance risks, limiting their adoption and reliability. These three challenges, integration complexity, resistance to change, and data security concerns, must be systematically addressed to unlock the full potential of PMIS in public ISDs.

Concerns about the security of data generally are especially prevalent in the Moroccan public sector where there are strict regulations governing how person data and Cyber Security should be managed. There are two specific laws in Morocco governing this subject: Law No. 09-08 which regulates protection of personal information and law No. 05-20 which provides governing framework for cyber security. Any PMIS usage within a Ministry must abide by CNDP regulations, which specify rules governing such things as how data will be stored, who will have access to that data as well as how the data may be shared among multiple ministries outside the ministry providing such data.

Also, any project data that is sensitive project data such as information pertaining to Future Contracts (Purchasing) and Vendor Contracts and Designs for Citizen Facing Systems, must be protected and classified according to the National Cyber Security Framework, and in addition to that framework, has to be under the purview of the DGSSI as well. These laws will dictate the structure of the PMIS, favoring on premise or Sovereign Cloud (with security as the main driver) rather than an International SOAS platform and actually form part of each PMIS implementation roadmap for the Ministerial ISD in the Public Sector.

Addressing these three critical challenges requires a comprehensive strategy combining technological solutions, organizational change management, and security enhancements. This includes ongoing investment in IT project manager training and awareness, robust IT security measures, and the development of PMIS solutions that are perfectly suited to the particular requirements of IT project management in public sector ISDs.

5.2 Future prospects

In order to address implementation obstacles and achieve optimal PMIS benefits, a three-fold strategy based on the relevant technological advances is proposed, as evidenced by the direct comparison of practicing PMIS within the Moroccan framework, exemplified by two cases. First, the stepwise development of the S@J-C project by the MoJ conducted in-house results in the successful implementation of the progressive rollout method during which the complex legacy nature of the environment is effectively dealt with by virtue of the thirty-five modules being developed during five years. Conversely, MNTAR's portfolio view concept, realized as part of Digital Morocco 2030, demonstrates the obvious management complications arising from unified governance of IT activities within several ministries but, unfortunately, lacks a common performance measurement system across the ministries. Thus, it can be inferred that different scale organizations require different PMIS concepts. Therefore, we can conclude that the process of adopting new technologies in project management information systems cannot be regarded as a universal solution. The readiness of the organizations for the use of this technology should be respected. Table 3 summarizes the key structural differences between these two cases.

Table 3: Comparative overview of PMIS in MoJ and MNTAR

Criterion	MoJ	MNTAR
Governance	Single ministry, single project, developed entirely in-house	Interministerial, multi-sector portfolio governance
Duration & Budget	5 years (S@J-C, 35 modules); budget not publicly disclosed	2024–2026; ~11 billion MAD
Performance measurement system	Internal, project-level tracking only; no standardized methodology	Macro-level targets (UN E-Government Index ranking); no shared operational KPI framework across ministries
Observed limitation	No cross-project benchmarking capability	No common performance measurement system across ministries

There are some limitations, however, regarding the adoption of the aforementioned technologies. First of all, the use of blockchain may resolve data safety issues, but in the case of the implementation of this technology in public information systems of Morocco, its appropriateness should be evaluated according to certain conditions, including implementation expenses, functionality level, and compatibility with outdated systems. But more importantly, compliance with legislation should be considered. Any blockchain solution used for managing sensitive data should comply with Law No. 09-08 regarding personal data and be approved by the CNDP. Moreover, it should meet the security requirements outlined in Law No. 05-20 by DGSSI, who does not support the use of decentralized and foreign solutions. Thus, the use of blockchain technology should be viewed as a future solution and not as a recommendation for use right now. The same issues faced in the implementation of other emerging technologies challenge organizations in relation to artificial intelligence and advanced analytics. The effectiveness of these technologies in terms of PMIS improvement relies on the level of preparedness of organizations as well as the quality of technical facilities accepted.

In the same manner, the introduction of big data analysis, machine learning, and artificial intelligence to PMIS can potentially enable anticipating risks and optimizing resources. Nevertheless, this is not possible for now due to the lack of funds, insufficient data quality, and absence of specialists in the field of artificial intelligence. Therefore, the mechanisms should be prepared and tested before getting widespread approval. Despite the value added by technological innovations, it is essential to analyze the contribution of other aspects regarding successful implementation of PMIS. Throughout this research, it became obvious that not only technical aspects but also organizational, managerial and human ones are crucial for successful implementation of PMIS in the Moroccan public sector.

Beyond technological improvements, successful PMIS implementation requires careful attention to system design, customization, and organizational readiness. Future PMIS developments should prioritize modular and customizable solutions that meet the specific regulatory and operational workflow requirements of public ISDs. This phased implementation approach allows departments to begin with pilot projects, gradually scaling while minimizing disruption and enabling continuous learning. Robust stakeholder engagement strategies, including early involvement of IT staff, project managers, and senior leadership, are essential to building organizational buy-in and addressing resistance to change. Moroccan administrations need to allocate dedicated resources to comprehensive training programs that cover not only technical PMIS functionalities but also promote a culture of data-driven decision-making and collaborative project management. Ultimately, the successful deployment of PMIS in public ISDs will depend on the convergence of emerging technologies, supportive policy frameworks, and strong organizational commitment to digital transformation, leading to more flexible, productive, and data-centric project management methodologies.

6. Conclusion

This conceptual study reveals that PMIS is a key lever for assessing and improving the operational performance of public ISDs. Our synthetic review identifies three primary mechanisms through which PMIS enhances operational performance: (1) improved coordination mechanisms that facilitate cross-functional collaboration and resource alignment, (2) real-time monitoring capabilities that enable proactive decision-making and early risk detection, and (3) data-driven decision-making processes that support evidence-based project management. Through these mechanisms, PMIS enables relevant resource allocation, effective IT project tracking, and multivariate operational performance assessment using indicators such as project delivery time, budget adherence, resource utilization, and stakeholder satisfaction.

These findings demonstrate that PMIS implementation fosters better decision-making, ensuring that public ISDs achieve strategic objectives while optimizing costs, deadlines, and quality, while reinforcing transparency, accountability, and agility in delivering digital services.

In Morocco, effective local implementation of the PMIS can only be achieved through 3 components converging: A phased rollout starting with pilot projects at the ministerial level; involvement of all stakeholders from project planning to project deployment; continued commitment to providing necessary technical training and building a data-based governance culture. Future research should be directed toward longitudinal comparative studies among the various ministries within Morocco and cross-national benchmark studies against other e-gov countries (e.g. Tunisia, Senegal).

References

- Archer, N. P., & Ghasemzadeh, F. (1999). "An Integrated Framework for Project Portfolio Selection", *International Journal of Project Management*, 17(4), pp. 207-216. [https://doi.org/10.1016/S0263-7863\(98\)00032-5](https://doi.org/10.1016/S0263-7863(98)00032-5)
- Arnaboldi, M., & Azzone, G. (2010). "Constructing Performance Measurement in the Public Sector", *Critical Perspectives on Accounting*, 21(4), pp. 266-282. <https://doi.org/10.1016/j.cpa.2010.01.016>
- Assou, S., & Chemlal, M. (2021). "The Performance Measurement in the Public Sector: What Perception?", *International Revue of Marketing and strategic Management*, 3(1), pp. 30-50.
- AXELOS. (2017). *PRINCE2, 2017 Edition: Managing Successful Projects*. TSO.
- Azim, S., Gale, A., Lawlor-Wright, T., Kirkham, R., Khan, A., & Alam, M. (2010). "The Importance of Soft Skills in Complex Projects", *International Journal of Managing Projects in Business*, 3(3), pp. 387-401. <https://doi.org/10.1108/17538371011056048>
- Benkada, A. (2024). "Digitizing Public Services: A Priority for Economic and Social Development in Morocco", *The International Congress in Innovation in Quantitative and Qualitative Research*, Tétouan, Morocco. <https://hal.science/hal-04520899/document>
- Bindguigne, M. & Akhlaffou, M. (2024). "Project Management Office of IT Projects in Information System Departments of the Moroccan Public Sector: The Added Value and Challenges", *International Journal of Project Management*, AJPO Journals Limited, Vol. 6(5), pp. 1-19. <https://doi.org/10.47672/ijpm.2549>
- Bouckaert, G., & Halligan, J. (2008). *Managing Performance: International Comparisons*, Routledge. <https://doi.org/10.4324/9780203935958>
- Brynjolfsson, E., & McAfee, A. (2014). *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*, W.W. Norton & Company.
- Cigref & Association Nationale des Directeurs Financiers et de Contrôle de Gestion (DFCG). (2023). "IT Department Performance: Financial, but Not Only", Cigref.
- Dunleavy, P., Margetts, H., Bastow, S., & Tinkler, J. (2006). "New Public Management is Dead—Long Live Digital-Era Governance", *Journal of Public Administration Research and Theory*, 16(3), pp. 467-494. <https://doi.org/10.1093/jopart/mui057>

- Fernandez, S., & Rainey, H.G. (2006). "Managing Successful Organizational Change in the Public Sector", *Public Administration Review*, 66(2), pp. 168-176. <https://doi.org/10.1111/j.1540-6210.2006.00570.x>
- Haloul, M.I.K., Mohd Ariffin, M.K.A., Supeni, E.E.B., Ahmad, S.A.B., Bilema, M., & Ahmad, M. (2024). "A Systematic Review of the Project Management Information Systems in Different Types of Construction Projects", *UCJC Business and Society Review*, 21(80). <https://doi.org/10.3232/UBR.2024.V21.N1.08>
- Hamal, V., & Tyagi, P. (2023). "Analysis of Effect of Project Management Maturity on Project Success in the Indian IT Industry", *International Journal for Research in Applied Science & Engineering Technology*, 11(7), pp. 302-317. <https://doi.org/10.22214/ijra-set.2023.54632>
- Hochstein, A., Tamm, G., & Brenner, W. (2005). "Service-Oriented IT Management: Benefit, Cost and Success Factors", *Proceedings of the 13th European Conference on Information Systems (ECIS)*, pp. 1-12.
- Hood, C. (1995). "The 'New Public Management' in the 1980s: Variations on a Theme", *Accounting, Organizations and Society*, 20(2-3), pp. 93-109. [https://doi.org/10.1016/0361-3682\(93\)E0001-W](https://doi.org/10.1016/0361-3682(93)E0001-W)
- ISACA. (2019). *COBIT 2019 Framework: Introduction and Methodology*. ISACA.
- ISO. (2020). *ISO 21502:2020, Project, Programme and Portfolio Management: Guidance on Project Management*. ISO.
- ISO/IEC. (2015). *ISO/IEC 38500:2015, Governance of IT for the Organization*. ISO.
- ITIL 4. (2019). *ITIL Foundation: ITIL 4 Edition*. AXELOS.
- Jaafari, A., & Manivong, K. (1998). "Towards a Smart Project Management Information System", *International Journal of Project Management*, 16(4), pp. 249-266. [https://doi.org/10.1016/S0263-7863\(97\)00037-9](https://doi.org/10.1016/S0263-7863(97)00037-9)
- Jarrar Y. & Schiuma G. (2007). "Performance Measurement in the Public Sector: Challenges and Trends", *Measuring Business Excellence*, 11(4), pp. 4-8. <https://doi.org/10.1108/13683040710837883>
- Kaplan, R.S., & Norton, D.P. (1996). *The Balanced Scorecard: Translating Strategy into Action*, Harvard Business School Press. ISBN: 978-0875846514.
- Levine, H. A. (2005). *Project Portfolio Management: A Practical Guide to Selecting Projects, Managing Portfolios, and Maximizing Benefits*, Jossey-Bass.
- MacDuffie, J.P. (1995). "Human Resource Bundles and Manufacturing Performance: Organizational Logic and Flexible Production Systems in the World Auto Industry", *Industrial and Labor Relations Review*, 48(2), pp. 197-221. <https://doi.org/10.1177/001979399504800201>
- Marrone, M., & Kolbe, L. M. (2011). Impact of IT service management frameworks on the IT organization. *Business & Information Systems Engineering*, 3(1), 5–18. <https://doi.org/10.1007/s12599-010-0141-5>
- Melville, N., Kraemer, K., & Gurbaxani, V. (2004). Information technology and organizational performance: An integrative model of IT business value. *MIS Quarterly*, 28(2), pp. 283–322. <https://doi.org/10.2307/25148636>

- Mergel, I., Edelmann, N., & Haug, N. (2019). "Defining Digital Transformation: Results from Expert Interviews", *Government Information Quarterly*, 36(4), Article 101385. <https://doi.org/10.1016/j.giq.2019.06.002>
- Mulcahy, R. (2002). *PMP Exam Prep: Rita's Course in a Book for Passing the PMP Exam*, RMC Publications.
- Mutwiri, M.I. & Muchelule, Y. (2022). "Project Management Information System Integration and Performance of Public-School Construction Projects in Kajiado County", *International Journal of Management and Commerce Innovation*, 10(2), pp. 116-126. <https://doi.org/10.5281/zenodo.7263407>
- OECD (2020). "Digital Government Index: 2019 Results", *OECD Public Governance Policy Papers*, No. 03. <https://doi.org/10.1787/4de9f5bb-en>
- Parmenter, D. (2015). *Key Performance Indicators: Developing, Implementing, and Using Winning KPIs*, John Wiley & Sons. <https://doi.org/10.1002/9781119019855>
- PMI. (2021). *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, Seventh Edition. Project Management Institute.
- Pollitt, C., & Bouckaert, G. (2011). *Public Management Reform: A Comparative Analysis – New Public Management, Governance, and the Neo-Weberian State*, Oxford University Press.
- Retnowardhani, A., & Suroso, A. (2019). " Project Management Information Systems (PMIS) for Project Management Effectiveness: Comparison of Case Studies", *International Conference on Computer Science, Information Technology, and Electrical Engineering (ICOMITEE)*, pp. 1–6. IEEE. <https://doi.org/10.1109/ICOMITEE.2019.8921046>
- Turban, E., Sharda, R., & Delen, D. (2011). *Decision Support and Business Intelligence Systems*, Prentice Hall.
- United Nations DESA (2024). E-Government Survey 2024. New York: United Nations. URL: <https://publicadministration.un.org/egovkb/en-us/reports/un-e-government-survey-2024>
- Van Helden, J., & Tillema, S. (2005). "In Search of a Benchmarking Theory for the Public Sector", *Financial Accountability & Management*, 21(3), P. 337-361. <https://doi.org/10.1111/j.0267-4424.2005.00224.x>
- Wangila, N. T., & Mucheule, Y. (2019). Influence of project management practices on performance outcomes in rural water projects development in Kenya. *International Journal of Social Science and Humanities Research*, 7(4), 368–386. <https://www.research-publish.com/upload/book/INFLUENCE%20OF%20PROJECT%20MANAGEMENT-8100.pdf>
- Wanyama, S. B., Eyamu, S., Ndanyi, D. M., Sansa, A. and Ayebale D. (2022). "Human Resource Value Creating Practices and Operational Performance in Uganda's Public Sector", *Journal of Management Policy and Practice*, Vol. 23(3). <https://doi.org/10.33423/jmpp.v23i3.5644>