

The impact of digital transformation on the efficiency of public-sector organizations: the case of the digitization of a public service in Morocco

L'impact de la transformation digitale sur l'efficacité des organisations du secteur public : Cas de la digitalisation d'un service public au Maroc

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The impact of digital transformation on the efficiency of public-sector organizations: the case of the digitization of a public service in Morocco.

Abstract:

Digital transformation has played an important role in modernizing services provided to users thanks to its many advantages, particularly in terms of accessibility, transparency, and speed of processing. Public organizations invest more and more in the digitalizing their administrative processes to improve efficiency and performance, in line with the principles of New Public Management (NPM). This work aims to study the impact of digitalization on the efficiency of public organizations. First, a quantitative study examines the nature of the relationship between cases processed on a digital platform over a six-year period and average processing times. It will then be supplemented by analysis of the results of a satisfaction survey of over 1,100 users, to assess their perception of the services provided digitally. The study finds a significant negative relationship between the digitalization of administrative procedures and the reduction of processing times. It also enhances transparency and user confidence. However, the lack of digitalization training for human resources and the lack of IT resources limits the achievement of the objectives expected from digital transformation.

Keywords : Digital transformation, New Public Management, public organizations, modernization, efficiency.

Classification JEL: H83, O38.

Paper type : Empirical Research

1. Introduction

Public management is an evolving, multi-disciplinary concept closely linked to the country's economic and political context, which is why it has changed so much over the years in a bid to improve and rationalize the management of public affairs. Before arriving at “New Public Management” public management went through several stages. At the outset, it is essential to focus on the notion of public management, in the knowledge that “New Public Management” represents a departure from public management. According to C. Pollit & G. Bouckaert (Pollitt & Bouckaert, 2011), public management is not neutral and depends on the context in which it operates. In this sense, “Public management is not a neutral technique, but an activity inextricably linked to politics, public policy, rights, and civil society issues. It is always underpinned by values and/or ideologies.”

The emergence of NPM takes us back to the 1970s, when pressure on governments was mounting, particularly after the first oil crisis in 1973, which created a difficult economic climate. In this context, the pioneering countries of NPM, such as England, New Zealand, and the USA, responded to this new situation by implementing budgetary and organizational reforms aimed at promoting the concepts of effectiveness, efficiency, and economy, as well as an organizational culture similar to that existing in the private sector. After these initial reform experiences, efforts were made to generalize and theorize these reforms, which led to the widespread dissemination of NPM principles worldwide.

In fact, the NPM is the result of several factors: globalization, the public sector's inability to adapt to new conditions, the inability of states to support the welfare state, and the suspension of the Bretton Woods agreements (Urio, 1998).

As for the notion of NPM, it has been the subject of several attempts by researchers to define it, which testifies on the one hand to the interest of the scientific community in the subject, and on the other hand to the complexity of the concept and the difficulty of defining it in a single way.

NPM was conceptualized by C. Hood (1991), who identified seven founding principles of NPM (professional management, explicit performance measurement standards, output control, decentralization, competition between public entities, private sector-inspired management practices and methods, and optimization of resource allocation).

So, the NPM marks a shift from a bureaucratic institutional logic to an organizational one, which is ideologically linked to “managerialism”.

According to Pillay (Pillay, 2008), NPM means the transformation of the public service from a traditional bureaucratic structure to a market-oriented entrepreneurial structure.

In this context, communication around NPM seeks not only to convince people of its principles, but also to present a certain ethic and practice likely to produce effects on the behavior of all agents involved in the public sector. On this basis, we can say that NPM constitutes a well-equipped doctrinal framework, offering a range of tools that influence management practice within an organization.

Amar & Bartier (Amar & Berthier, 2007) present the main idea behind NPM as follows: “Private sector management methods, which are superior to those used in the public sector, can be transferred to the latter. The public sector is considered inefficient, excessively bureaucratic, rigid, costly, focused on its own development (Leviathan effect), uninnovative, and overly centralized.” On this basis, the authors consider it important to increase the scope for maneuver of public managers in order to better meet the demands of citizens, who become “customers” according to the new conception of the public sector, with all the requirements that this may entail, especially in terms of quality.

Furthermore, digital transformation has changed people's habits and ways of doing things on several levels. Due to its cross-functional nature, digital transformation affects all economic,

social, administrative and commercial fields. This migration towards digital services can be explained in particular by the high connectivity of the global population.

Indeed, cellular networks now cover more than two-thirds of the world's population, with 5.4 billion people using the internet in 2024, or 67% of the world's population (Telecommunication Union International, 2025). Mobile telephony has taken a leading place among the most widespread technologies in the world. In some countries, more people have access to mobile phone services than to a bank account, electricity, drinking water, secondary education, or healthcare. According to the World Bank, the internet and related technologies have reached developing countries much faster than previous technological innovations. For example, it took Indonesia 160 years to reap the benefits of the invention of ocean liners and Kenya 60 years to get electricity. In contrast, it took Vietnam only 15 years to acquire computers, and the introduction of mobile phones and the internet took only a few years.

In terms of geographical distribution, Europe leads the way in mobile penetration, with 112% in 2024 and 4G accounting for 95% of mobile connections worldwide. This momentum is also remarkable in terms of 5G connectivity. In fact, approximately 52% of the world's population is covered by the 5G network, including countries in Asia-Pacific, North America, and Europe (Ericsson, 2025).

This migration to digital is not insignificant for the structure of government jobs in developing countries, which have shifted more towards ICT-intensive jobs. By 2024, 90% of United Nations (UN) member states will offer online services.

Among the most common government administrative services are civil registry management (70% of countries), tax management and payment (85%), utility bill payment (65%), and e-procurement (60%). The e-government development index stands at 83% in Europe in 2024 and 43.5% in Africa (Telecommunication Union International, 2025). Developing countries have invested more in the digitalization of public services, which has led to an improvement in the E-government Development Index in Africa, driven in particular by the digitalization efforts of pioneering countries such as Morocco. In this regard, in 2024, 87% of African countries will have an online government portal, compared to 42% in 2014, reflecting a strong desire and commitment to embrace the digitalization of online public services.

For its part, Morocco has made real progress in terms of access to and use of NICTs, with "4G mobile network coverage reaching 98.63% in 2024. Internet penetration rose from 9.9% in 2011 to 92.99% in 2024. As a result, the number of broadband subscriptions in Morocco continues to grow rapidly, rising from 1.2 million in 2009 to around 38.3 million in 2024, representing an average annual growth rate of 35.8%. Despite this growth, broadband penetration remains relatively low, placing Morocco 93rd for fixed broadband and 91st out of 141 countries for mobile broadband in the WEF's 2019 ranking.

Digital transformation influences managerial decisions in various sectors and contexts (Benner & Waldfogel, 2020; Correani, Massis, Frattini, Petruzzelli, & Natalicchio, 2020) and as such, digital transformation has evolved from a technological opportunity to a managerial necessity in order to meet the growing needs of the population (Durst, Ferreira, Veiga, Kailer, & Weinmann, 2022). It is also a priority for managers seeking to strengthen the competitiveness and performance of their organizations (Elia, Solazzo, Lerro, Pigni, & Christopher L. Tucci, 2024).

Digital transformation should therefore not be seen as a guarantee of success, but as a process of change that needs to be supported. Tensions can also arise, as studies of high-reliability organizations have shown, where IT staff adopt protective behaviors in response to these changes (Kersten, Khanagha, Hooff, & Svetlana N. Khapova, 2023).

This leads us to a pertinent question: what is the impact of digital transformation on efficiency of public organizations? This central question leads to the following sub-questions:

- What are the efficiency gains from digitizing a public service?

- What are the effects of digitizing a public service on users?
- What are the constraints on the digital transformation of public services?

To address this issue, it is necessary to first present a thorough state of the art on the concepts of New Public Management (NPM) and digital transformation, in order to establish a theoretical framework that will structure the analysis. This framework will allow us to put the mechanisms of modernization of public action and the contributions of digital technologies in the context of improving managerial performance.

The objective of this research is threefold: to measure the impact of digitalization on the processing time of administrative files, to analyze the perception and acceptance of users of the digital solution through the Technology Acceptance Model (TAM), and to identify the main organizational constraints that may limit the effectiveness of the digital solutions implemented. Thus, this work will allow us to present original results on the Moroccan case, which is still poorly documented in the international literature, in terms of the digitalization of public services. Theoretically, it contributes to enriching existing work by linking the principles of NPM with the TAM model, thus offering an integrated reading of the effects of digital transformation on the modernization and effectiveness of public management.

To achieve this, we use a mixed methodological approach combining quantitative and qualitative research. The quantitative analysis is based on a linear regression applied to the data from the cases processed via a digital platform and the average processing times observed. In addition, the qualitative approach is based on a documentary analysis and the results of a satisfaction survey conducted among over 1,000 users, which allows us to understand the perceptual, organizational and managerial dimensions of digitalization.

2. Literature review

2.1. NPM and performance of public organizations

According to Charbonneau (2012), “New Public Management is a model of public administration management that stands in opposition to the bureaucratic management model.” Then he equates NPM with a model that is designed in opposition to the bureaucratic system in order to compensate for its shortcomings.

Since NPM draws inspiration from two theoretical currents, namely new institutional economics and managerialism, it is a relatively coherent set of ideas. The common thread between these two schools of thought is the desire to adopt private sector practices in the public sector in order to overcome the shortcomings of the traditional management model, moving from a rigid, inefficient, and slow decision-making process to a flexible, effective, and efficient process focused on customer service.

Furthermore, Sezen (2011) considers NPM to be a generic and universal model that serves as a benchmark for reforms worldwide, likening it to a global public policy. Indeed, the terminology used in reforms is similar and revolves around efficiency, decentralization, results-based management, performance, etc.

If we look back at previous administrative reforms, we see that these elements are not new, but rather very old. According to Sezen (2011), “The distinctive feature of the NPM reforms, however, is the replacement of the citizen with the customer, as well as the replacement of egalitarian and abstract values, such as the general interest and the common good, with market-oriented objectives.”

Most of the reforms implemented in the public sector over the past two decades have been inspired by “New Public Management” (Osborne, 1993; Lévesque, 2013). According to Benoit LEVESQUE, NPM is a set of new ideas that highlight the role of government and ways of modernizing administrative practices to improve public services.

The multiplicity of definitions of the concept of NPM clearly demonstrates the controversy surrounding this concept and the diversity of perspectives from which it can be approached or interpreted.

However, from an analysis of the various definitions presented by researchers on the concept of NPM, it appears that they are at least unanimous on the following two ideas:

- NPM aims to transpose private sector management rules to the public sector;
- NPM equates citizens with customers in the private sector.

Other authors, such as Y. Pesqueux (Pesqueux, 2024), consider that: "NPM is a political and economic framework initiated by the World Bank in the 1990s to serve as a guide for the modernization of government services. It proposes replacing a regulatory approach with a managerial approach based on the concept of contracts in order to increase the efficiency and flexibility of public services by simplifying administrative procedures and granting greater autonomy in exchange for performance obligations, introducing quality management and management control procedures, a focus on the customer, more flexible procedures, the creation of agencies, and contractualization. Nevertheless, the transfer of management methods from the private sector has raised many questions about its relevance, particularly with regard to the "values" of public service (integrity, fairness, etc.).

Furthermore, several authors associate the emergence of the term NPM with the public administration reform launched in England, combined with both the rise of nascent neoliberalism and Margaret Thatcher's arrival in power in 1979. In the years that followed, most English-speaking countries joined in the same reform movement initiated by England. However, Christopher HOOD explains the rise of NPM by the emergence of four other administrative "megatrends" that are linked to NPM, namely:

- Control of public spending and staffing (Hood & Dunsire, 1983) ;
- Privatization and quasi-privatization of certain public entities (Hood and Schuppert 1988; Dunleavy 1989);
- The development of ICT, especially in the provision of public services;
- The development of a general culture around public management and best practices in this area.

The authors' opinions on the rationale of NPM are divided: G. Chevalier sees NPM as the answer to the growing demands of citizens who position themselves as customers, while for P. Rosanvallon, NPM responds to an ideological transition towards everything ethical. Since the state has lost its symbolic value, it now works to justify its interventions and practices. In this sense, R. Laufer & A. Burlaud (2015) consider that "the state, through public reform processes, seeks to prove that it too is concerned with management and efficiency, thus giving reforms an equally symbolic dimension."

So, NPM can be seen as a set of principles that can be transferred from one culture or political system to another. Academic debate on this topic will ultimately help identify best practices, enabling policymakers to make informed decisions about reform.

NPM has emerged as a new paradigm that aims to establish a performance-based management culture within the public sector and attempts to reduce the centralization of power that prevailed in the public sector. According to David G. Mathiasen (1999), this new paradigm is characterized by:

- Results-based management, particularly in terms of effectiveness, efficiency, and quality of service;
- Strengthening decentralization and devolution so that decisions are taken at the level closest to the citizen;
- Flexibility in terms of choosing management and regulatory alternatives that optimize results and achieve better performance;

- Efficiency in the provision of public services, accompanied by the development of production targets to create a competitive environment between public structures;
- Strengthening the strategic role of the central level in order to guide decentralized and deconcentrated entities towards the most effective and least costly choices.

In this context, NPM has emerged as a new trend that promotes the adoption of management techniques used in the private sector within the public sector to improve public sector management. This transition is common to several OECD member countries and developing countries that have drawn inspiration from NPM principles in their public administration reforms.

2.2. Digital transformation in the public sector

The concept of digital transformation refers to the use of ICT to improve the quality of services provided and keep pace with technological developments in the Internet age.

In everyday language, the concepts of “digitization” and “digitalization” are used interchangeably, i.e., to mean the same thing. However, in scientific language, these are two technically different concepts. “Digitization” is the process of converting analog information into digital format (Brynjolfsson & McAfee, 2014; Larsson & Viitaoja, 2017). “Digitalization” uses digitization to develop new tools that enable optimization (Robert, 1971; Castells, 2010; Mergel, Edelmann, & Nathalie Haug, 2019).

In general, “digitalization” refers to the transition from traditional management to a new organizational culture based on digitization (Dijk, 2012; Larsson & Viitaoja, 2017). Digitalization optimizes the organization's information flow and streamlines its operation instantly.

The multiplicity of definitions of the concept of digitalization reveals its cross-cutting nature, as well as the multiple uses of the concept, which can vary depending on the context and field of use. The table below presents some definitions of the concept of digital transformation in the scientific literature.

Table 1 : Definitions of digital transformation.

Authors	Definition
(Collin, et al., 2015) ; (Gimpel & Maximilian Röglinger, 2015); (Kane, Palmer, Phillips, Kiron, & Buckley, 2015)	While digitization is the conversion of analog information into digital format, digital transformation refers to a broad concept that encompasses political, commercial, and social aspects.
(Gregory Vial, 2019)	A process aimed at improving an entity through significant changes in its properties using ICT.
(Hanelt, Bohnsack, Marz, & Marante, 2021)	Organizational change shaped by the spread of digital technologies, integrating malleable models into digital ecosystems.
(Andal-Ancion et coll., 2003) ; (Alvarenga, Carneiro, Fanguero, Cordovil, & Bernal, 2020)).	“The use of information technology and electronic tools to improve, personalize, and automate the delivery of public products and services to citizens and businesses through the standardization of internal administrative processes.”
(Verhoef, et al., 2021)	Requires specific structures and impacts organizations' performance indicators.
Westerman et al., 2011)	“The use of ICT to radically improve business performance or reach.”
(Gurbaxani & Dunkle, 2019)	Fundamental redefinition of organizational processes and structures to exploit the opportunities offered by digital technologies.
(Yayla & Lei, 2020)	Profound changes reshaping competitive dynamics and promoting innovation and adaptation to a changing environment.
(Chui, Issler, Roberts, & Yee, 2023)	Completely reinventing organizational processes to improve the customer experience, reduce costs, and promote agility through digital technologies.

Indeed, digital transformation in the public sector is known by various names: digitization, digitalization, digital government. The United Nations (UN) and the American Society for Public Administration (ASPA) offer a definition of the concept of e-government: "In its

broadest sense, e-government includes the use of all information and communication technologies, from fax machines to wireless Palm handheld computers, to facilitate the day-to-day administration of government. However, like e-commerce, the popular view of e-government includes only Internet-related activities. It should be added that the aim is to improve citizens' access to government information, services, and expertise in order to promote citizen participation in and satisfaction with the government process. It is an ongoing commitment by the government to improve the relationship between private citizens and the public sector through improved, cost-effective, and efficient services, information, and knowledge. It is the realization, in practice, of the best that government has to offer.

In order to provide high-quality public services efficiently, governments are stepping up their efforts to successfully transform public services digitally.

This involves developing new channels of communication and interaction with citizens, streamlining government actions, and improving their efficiency. They are moving towards a hierarchy of open, online, and integrated operations.

The 1980s marked the beginning of the digital transformation, with computers being installed in public administrations. This trend towards the digitalization of administrative procedures has evolved over the years thanks to the development of technology and internet coverage.

The introduction of digitalization into the management of public services is known as "e-government " (Clément, 2021; Milakovich, 2021). This allows interaction with citizens in a way that is both accessible and transparent. The aim is to improve the quality of services provided to citizens.

The development of digital administration has been facilitated by the widespread adoption of new technologies among the population, the development of internet access services around the world, and the development of computer hardware and improvements in its capabilities. All these factors have led to a large influx of individuals using digital services in general.

2.2.1. The foundations of digital transformation:

Digital transformation is based on three fundamental pillars (Varenne & Godé, 2023): dematerialization, automation and disintermediation, which are complementary levers for modernizing public organizations. Dematerialization refers to the gradual replacement of physical media by digital media in the performance of administrative activities, thereby simplifying procedures, reducing management costs and improving the traceability of operations (Calexa, 2018). Automation, on the other hand, involves entrusting information systems with the execution of repetitive and standardized tasks that do not require specific skills, in order to free up time for more value-added activities and increase operational efficiency (Baudoin, Diard, Benabid, & Cherif). Finally, disintermediation aims to reduce the number of intermediaries between the public service provider and the end user, promoting more direct interaction, better responsiveness to the needs of beneficiaries and more fluid decision-making processes, including within organizations where actors can obtain the necessary validations without resorting to complex hierarchical circuits (Hammond, Coulon, Hallett, Thomas, & D. et Beriro, 2022). Together, these three pillars reflect a profound reconfiguration of administrative operating methods, at the heart of contemporary dynamics of digital transformation in public management. Consequently, the main hypothesis is as follows:

Hypothesis 1: The digitalization of administrative procedures positively influences the efficiency of public service.

2.2.2. Levels of digital transformation:

The digital transformation of the public sector is part of an evolutionary trajectory marked by several levels of organizational and technological maturity (Xavier & Choi, 2021). It begins with e-government, which focuses on the provision of online public services to improve access

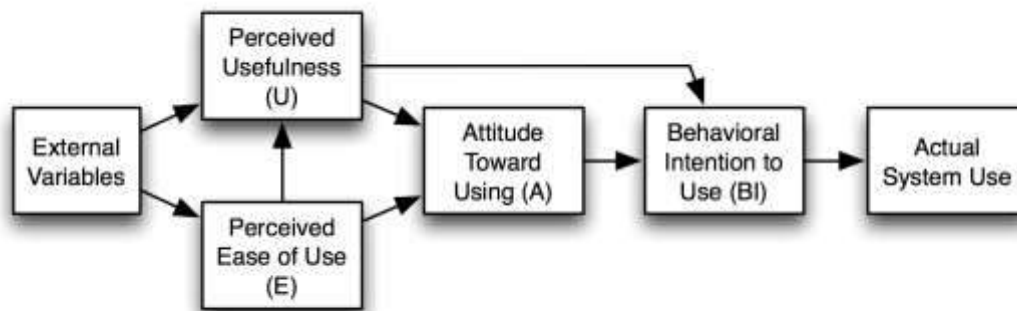
for users, streamline administrative intervention and increase the effectiveness of public action. This first phase evolves into open government, which is based on a logic of openness and transparency towards citizens, notably through the communication of public strategies, the dissemination of institutional information and the provision of open data to promote participation and accountability. The stage of data-driven government marks a deepening of this dynamic by placing the quality, relevance and usefulness of data at the heart of public decision-making, with a particular focus on their contribution to the achievement of strategic objectives.

At a more advanced level, the fully transformed government is characterized by the systemic integration of data across all governance processes, supported by open data-based innovation practices and the smooth circulation of information between different organizational units, leading to a significant improvement in interactions and services provided. Finally, the smart government represents the most advanced stage of this evolution, integrating advanced digital technologies into administrative processes to enhance anticipation, adaptability and value creation in public action.

2.3. The adoption of technologies according to the TAM model:

Furthermore, to explain ICT user behavior and perceived performance, Fred DAVIS designed a technology acceptance model (TAM) in 1993, which he summarized as follows:

Figure 1 : The TAM according to Davis.



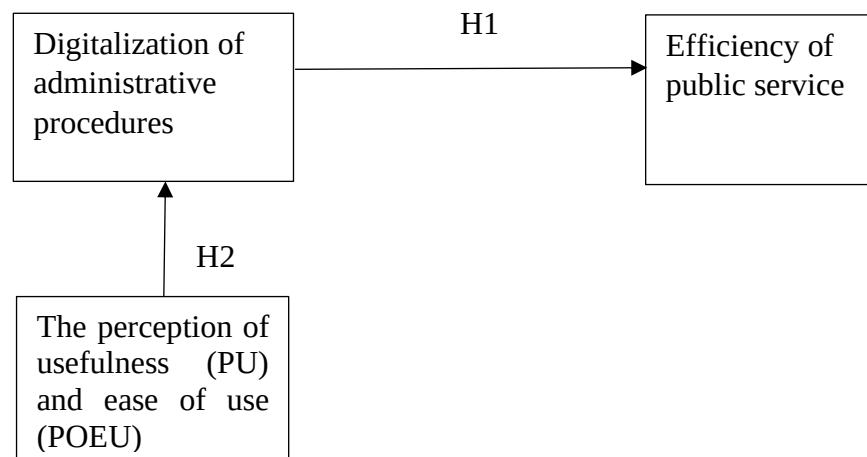
Source: Fred DAVIS, 1993.

The Technology Acceptance Model (TAM) developed by Davis (Davis, 1993) allows us to study the adoption of ICTs through two fundamental variables: perceived usefulness (PU) and perceived ease of use (PEOU) (S. Atarodi, 2019). These two components are based on an analysis of the impact of ICT on the user. In this sense, “perceived usefulness” (PU) refers to the response of ICT to the user's needs in terms of efficiency and expected results. Perceived ease of use (PEOU) refers to the ability of the ICT used to meet the user's needs in terms of cost and ease of use.

A third component in this model is the user's behavioral intention to use (BIU), which ultimately determines the actual usefulness of ICT.

In this article, we opt for the TAM model to analyze the compatibility of digital solutions adopted in the Moroccan context with the main components of TAM (PU, PEU, BI, usage). This will provide a clear overview of the performance of the digital services studied. Therefore: **Hypothesis 2:** *The perception of usefulness and ease of use positively influences the use of digital solutions.*

Figure 2 : The model research.



2.4. Moroccan context and public policies implemented

2.4.1. Institutional context

Morocco has made remarkable efforts to promote the country's digital transformation, which has resulted in the launch of several programs and strategies, namely “Morocco Numeric 2013,” “Morocco Digital 2020,” and “Digital Morocco 2030.” In addition, Morocco has institutionalized digital transformation through the creation of the “Digital Development Agency (DDA)” and the “National Commission for the Control of Personal Data Protection (NCPDP)”. With this in mind, several projects to digitalize public services have been launched, including: the “Idarati” portal dedicated to administrative procedures, online payment of taxes and duties (vignette, IR, IS, VAT, etc.), the “PortNet” one-stop shop, WATIQA.MA, WRAQI.MA, Mahakim.ma, the “Chikaya” portal (complaints), the “TELMIDTICE” platform (distance learning), the digital registry office, the COVID-19 platform, RNP.ma and RSU.ma, and other initiatives related to digital public services.

Efforts to promote digital transformation in Morocco have resulted in an improvement in the United Nations ranking, with Morocco coming in 90th out of 193 countries in the “E-Government Development Index (EGDI), up from 101st place in 2022 and 106th in 2020.

2.4.2. Case study selection

In this context of strengthening digital services made available to citizens, the ‘Rokhas.ma’ platform was set up in 2019 and generalised in April 2020, after the Covid-19 pandemic, for the digitalisation of the process of granting urban and economic permits. Thus, the granting of building permits has become fully digitalised, and offers a range of online services: submission of the application, real-time monitoring of the progress of the processing, payment of taxes, and obtaining the authorisation decision.

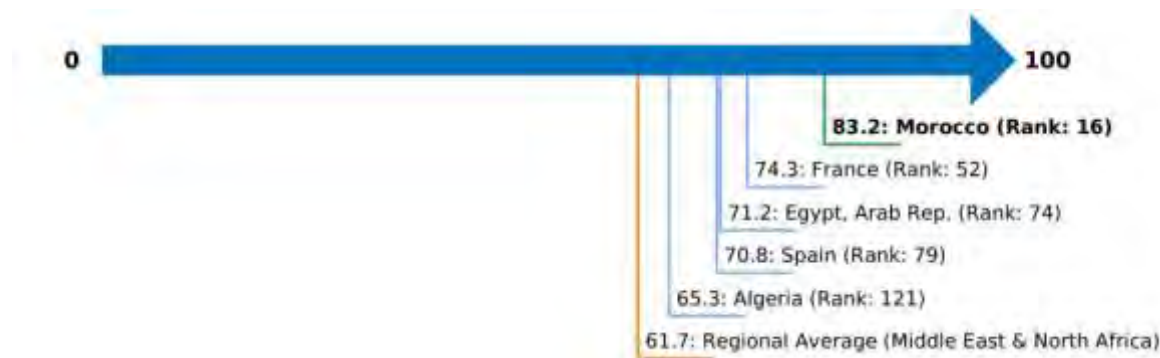
In fact, the issuance of a building permit is of major interest, as it constitutes the starting point for investment projects, particularly in the industrial sector. In this sense, the implementation of the Rokhas.ma platform aims to simplify administrative procedures in order to issue building permits within the regulatory deadlines: 30 days for large projects and 15 days for small projects.

Furthermore, the World Bank's “Doing Business” ranking, which measures the business climate in member countries, includes the granting of constructions permits as an essential component influencing the overall ranking of countries. The indicator relating to the granting of constructions permits assesses the procedures, timeframes, and costs involved in constructing

a warehouse. Improving the time it takes to obtain a construction permit is a key indicator of investment attractiveness.

In 2020, Morocco achieved its best ranking for granting constructions permits, coming in 16th place worldwide. This reflects the combined positive effects of digitalizing the construction permit process and controlling processing times. With this ranking, Morocco outperformed several countries such as France, Spain, and Egypt, as illustrated in the figure below:

Figure 3: Doing Business 2020 Dealing with Construction Permits Score.



3. Methodology

This section is divided into three sub-sections. The first will be devoted to the presentation of the context and the study area in which our research model is embedded. The second sub-section provides an overview of the data collection method. Finally, the third sub-section relates to the methodology of analysis and processing of the collected data.

3.1. Research model

This study will examine the relationship between the number of files processed digitally and the processing time for each file. In this sense, we use the digitalization of the building permit granting process as the independent variable, reflected in the number of files processed on “Rokhas.ma”. As for the dependent variables, we are working on efficiency gains for the public service and user satisfaction. Thus, efficiency gains are measured by the time taken to process files, which reflects the speed of the service (Szedmák, 2025).

3.2. Data collection

This work aims to study the impact of the digital transformation of the building permit issuance service in Morocco on processing times and the efficiency of this service. In order to study the impact of digitalization on the efficiency of public organization management, we conducted an empirical study based on quantitative data relating to the digitalization of the construction permit granting process via a digital platform in Morocco called “Rokhas.ma” over the period 2019-2024, coinciding with the start of the widespread use of paperless construction permit processing in Morocco. The data was collected from the open data platform offered by “Rokhas analytics”, which offers a diverse panel of dashboards on the various authorizations provided on “Rokhas.ma”. This consists of data on the number of construction permits issued between 2019 and 2024, broken down by “big projects” and “small projects”, as well as processing times for each type of project.

3.3. Data analysis

To do this, firstly, we use correlations to study the nature of the relationship between the number of constructions permits issued on the “Rokhas.ma” platform and the average processing time. Then, we use linear regression to study the causal relationship that may exist between the

variables studied. The statistical aspect of the study will be carried out using SPSS software. The use of a quantitative study stems from the desire to obtain neutral results regarding the impact of digitalization on the modernization of public organization management.

$$PT_{t,p} = \alpha + \beta_1 DIG_{t,p} + \beta_2 TYPE_p + \epsilon_{t,p}$$

In this equation “PT” represent average processing time (in days) for construction permit by project type p and year t, “ α ” is baseline processing time, “type_p” dummy variable (1=big projects, 0= small projects), “ $\epsilon_{t,p}$ ” is error term.

In addition to the statistical results of the quantitative data, we are using the results of a survey on perceptions of the “Rokhas.ma” platform conducted among more than 1,100 users (individuals, professionals, and civil servants). This will enable us to assess the overall level of satisfaction with this digital platform, processing times, and ease of use.

This survey focused on the ergonomic aspect of the platform (PEOU), the usefulness of the platform (PU), the ease of use (PEOU), and the constraints related to its use (PEOU), and the overall satisfaction of users (BI). It was launched in 2021 among users of the “Rokhas.ma” platform (Sunergia, 2021), targeting 377 individuals, 280 architects, 459 public agents, 28 revenue managers, and 25 municipal presidents.

4. Results

The results of this study will be presented in two subsections. The first will be dedicated to the presentation of quantitative results. The second will present the qualitative results.

4.1. Quantitive results

The granting of construction permit is one of the most important aspects managed by the Rokhas.ma platform, given its technical complexity and its link to investment and economic development. Data relating to construction permit issued on the Rokhas.ma platform during the period 2019-2024 are presented in the following table:

Table 2: Status of constructions permits issued on “Rokhas.ma” between 2019 and 2024.

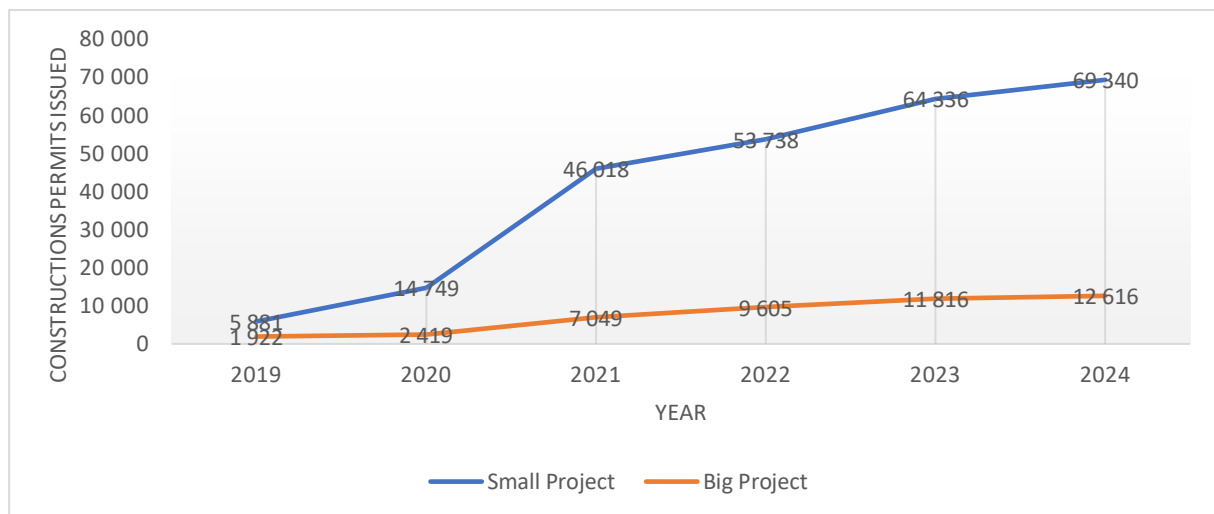
Year	“Small Project ”	Average time Small Project	Big Project	Average time Big Project	Total	Evolution
2019	5 881,00	74,75	1 922,00	150,17	7 803,00	
2020	14 749,00	57,09	2 419,00	112,55	17 168,00	120%
2021	46 018,00	48,37	7 049,00	91,63	53 067,00	209%
2022	53 738,00	38,40	9 605,00	71,49	63 343,00	19%
2023	64 336,00	24,81	11 816,00	60,63	76 152,00	20%
2024	69 340,00	24,50	12 616,00	53,40	81 956,00	8%
Total	254 062,00	44,65	45 427,00	89,98	299 489,00	

Source: <https://dataurba.ma/OpenData/PermisConstruire>

The digital issuance of constructions permits has become the norm in Morocco, thanks to the widespread use of the “Rokhas” platform at the national level. This is evident in the number of constructions permits issued between 2019 and 2024. In fact, since 2020 the number of constructions permits issued via the Rokhas platform has increased significantly thanks to the accelerating effect of the COVID-19 pandemic, which has prohibited all physical contact.

In this sense, the number of constructions permits issued via the Rokhas platform has continued to increase since 2020, reaching 17,168, an increase of 120%. then increased by 209% in 2021, 19% in 2022, 20% in 2023, and 8% in 2024. The figure below illustrates the evolution of the number of constructions permits issued on the digital platform:

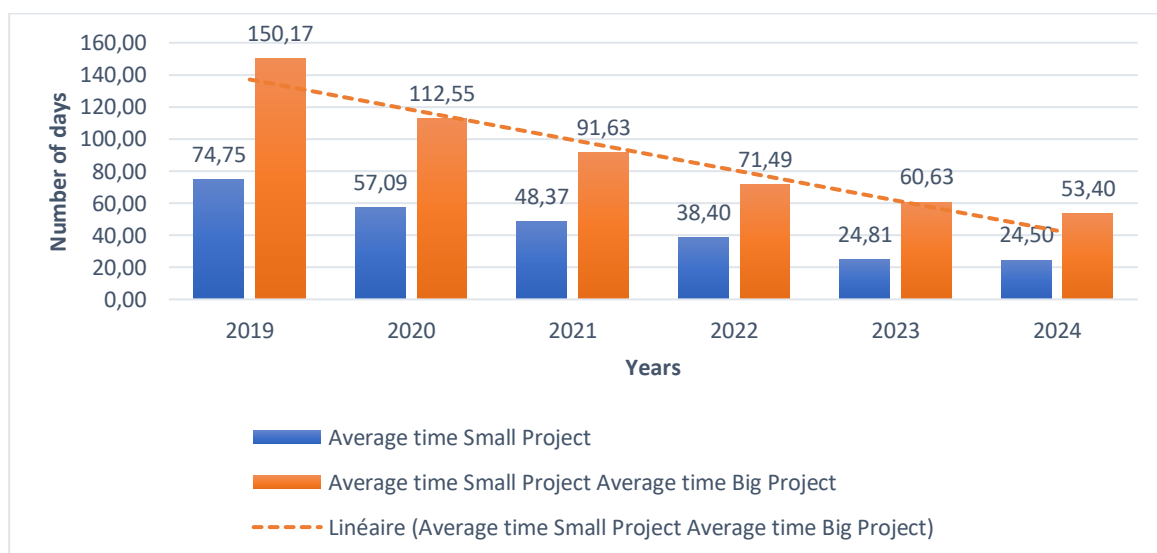
Figure 4: Construction permits issued on “Rokhas.ma”.



This demonstrates the strong support of all stakeholders in the project to digitalize the construction permit process due to its many advantages in terms of reducing approval times, ease of access, visibility, and full traceability of the steps and documents required.

Issuance times are falling steadily, with the average time taken to grant a construction permit over the period 2019-2024 standing at 44.65 days for small projects and 89.98 days for large projects. For small projects, this time has fallen from 74.75 days in 2019 to 24.50 days in 2024. For large projects, the average time to obtain a construction permit fell from 150.17 days in 2019 to 53.40 days in 2024. The figure below illustrates the evolution of processing times over the period 2019-2024:

Figure 5: Evolution of average processing time.



A statistical study of the relationship between the digitalization of the construction permit application process and processing times is essential to verify the nature of the relationship between these two elements. The study will focus on digitalized constructions permits and average processing times since the widespread adoption of the “Rokhas” platform in 2019 until 2024.

Before studying the relationship between the average processing time and the number of digitalized files, it is necessary to study the normality of the data relating to these two variables.

Table 3: Tests of Normality.

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Big project	.201	6	.200*	.892	6	.329
Average time Big project	.194	6	.200*	.925	6	.540
Small project	.222	6	.200*	.891	6	.321
Average time small project	.178	6	.200*	.933	6	.603

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The results of the normality test show that the Shapiro-Wilk significance level is greater than 0.05. This indicates that the distribution of our variables follows a normal distribution. Therefore, it is possible to proceed with parametric statistical tests.

Table 4: Descriptive statistics and correlations.

	N	Min	Max	Mean	Standard deviation	Pearson correlation
Big project	6	1922	12616	7571,17	4611,64	-,954
Average time Big project	6	53,40	150,17	89,98	36,54	-,954
Small project	6	5881	69340	42343,67	26255,62	-,965
Average time small project	6	24,50	74,75	44,65	19,56	-,965
Valid N	6					

Over the last six years, the number of constructions permits for “major projects” issued digitally on the “Rokhas” platform has varied between 1,922 and 12,616, with an average of 7,571. The average processing time ranges from 53.40 days to 150.17 days, with an average of 89.98 days. The standard deviation is 4,611.64 in terms of the number of constructions permits and 36.54 days in terms of processing time. This high standard deviation confirms that the digital platform was in the process of being rolled out during the 2019 financial year.

For “small projects,” the number of constructions permits issued digitally over the 2019-2024 period ranges from 5,881 to 69,340, with an average of 42,344. The average processing time varies between 24.5 days and 74.75 days, with an average of 44.65 days. The standard deviation is 26,255.62 in terms of the number of constructions permits and 19.56 days in terms of processing times. This high standard deviation confirms that the digital platform was in the process of being rolled out during the 2019 financial year.

Pearson's correlation coefficients reveal a strong and significant negative relationship between the number of constructions permits issued digitally and the average processing time for both “large projects” ($r=-0.954$; $p<0.01$) and “small projects” ($r=-0.965$; $p<0.01$). This indicates that the use of digital processing of files makes it possible to control and reduce processing times. This result is illustrated by the figure above, which confirms the positive effect of digitalization on administrative efficiency.

Table 5: Results of parametric tests.

Model	B	Beta	t	p	R ²	Adjusted R ²	F	Sig	VIF
BP/Average time	-,008	-,954	-6,371	,003	,910	,888	40,593	,003	1
SP/Average time	-1295,478	-,965	-7,381	,002	,932	,915	54,483	,002	1

The results of the linear regression confirm the significant link between digitalization and reducing processing times. A priori, the validity and significance of the model has been confirmed for small projects ($F=54.483$; $p=0.002<0.01$) and for large projects ($F=40.593$; $P=0.003<0.01$). Similarly, this model significantly explains 91% of the variance in the average

processing time for large projects and 93% of the variance in the average processing time for small projects.

The regression coefficient is negative and statistically significant ($P < 0.01$) with $B = -0.008$ for big projects and $B = -1295.478$ for small projects, indicating that an increase in the number of constructions permits issued digitally leads to a reduction in processing times.

Beyond the dematerialization of the construction permit granting process, other determinants can contribute to the reduction of average processing times. In particular, this development is taking place in a context marked by a strengthening of the legal and institutional framework aimed at regulating administrative deadlines. In this regard, Law No. 55-19 on the simplification of administrative procedures and formalities (2020), as well as the joint decision of the Ministry of the Interior and the Ministry responsible for urban planning (2023), have established explicit ceiling deadlines, set at 30 days for “big projects” and 15 days for “small projects,” thus contributing to the acceleration of the processing of applications.

4.2. Qualitative results

Despite these strengths and advantages of digitalizing the urban planning permit process, certain limitations remain. In this regard, the perception survey has reported an overall satisfaction rate of 52% for users and 85% for public agents (BI).

The platform's ergonomics (PEOU) received the highest rating, with a satisfaction rate of 91%, followed by the tasks performed on the platform (PU), with 88%. According to the survey, the least satisfactory aspects were ease of navigation, with 73%, and page display speed (PEOU). At the same time, public agents feel a need for digital training in parallel with the development of digital activities (PEOU). In addition, some users highlight technical constraints that manifest themselves in difficulties with electronic signatures, the incompatibility of IT or digital equipment with the platform, and the inability to cancel payments in the event of errors and/or bugs, which are frequent during navigation.

5. Discussion of results:

The digitalization of public services offers a range of benefits to both users and the administration. Its ease of use allows for easy, smooth, and equitable access for all users while reducing the costs associated with travel and the preparation of physical files. It also improves transparency and user confidence due to the traceability of the entire process, which offers real-time tracking of submitted files.

The strong adherence of users to public online services indicates the benefits of digital transformation in terms of convenience of use, speed of processing, transparency and quality of service. This refers to overall satisfaction due to ease of use (PEOU) and utility of use (PU), which corroborates the stipulations of the TAM model. Indeed, the TD of public services also allows for the modernization of the management of public organizations through the proposal of innovative solutions for the management of their affairs, which allows them to improve the quality of services provided and the satisfaction of users, and consequently the intention to continue the use of digital solutions (BI).

The high level of user acceptance of online public services demonstrates the advantages of digital transformation in terms of ease of use, speed of processing, transparency, and quality of service. The digital transformation of public services also makes it possible to modernize the management of public organizations by offering innovative solutions for managing their affairs. This enables them to improve the quality of services provided and user satisfaction, enhance the transparency and traceability of operations, and guarantee equitable access for all users.

The case of the “Rokhas” platform shows us that digitalization makes it possible to control and reduce processing times, and consequently improve user satisfaction through real-time monitoring tools at all stages of operations, allowing action to be taken on “bottlenecks.”

However, certain limitations hinder the realization of the potential offered by the digitalization of public services. These include the lack of training and support for human resources in the area of digitalization to support digital development in Morocco. In addition, technical difficulties and bugs in digital platforms impact the decision-making process and require increased responsiveness from the solution provider to remedy them. In some cases, the incompatibility of IT and digital infrastructures with the requirements of the digital platform prevents the effective use of the platform.

Hence the need to invest in training users, particularly public agents and professionals, in order to align them with the platform's objectives and expectations and raise their awareness of data security. Not to mention raising awareness of the importance of adapting users' digital and IT infrastructures to the requirements of the digital platform for optimal operation.

This work also opens up future research perspectives that can enrich the scientific literature, in particular by complementing the individualistic reading grid of digitization according to the TAM model with approaches to state capacity. In this sense, the dimensions related to ease of use (PEOU) and utility of use (PU) indicate levels of administrative capacity. In other words, the performance of digitization depends not only on the dimensions of the TAM model but also on the capacity of the administration to mobilize qualified human resources and adequate technical resources.

6. Conclusion:

In light of the above, NPM is a school of thought that aims to modernize the structure of public organizations in order to provide high-quality public services that meet citizens' needs at a lower cost. This means that the state must act effectively to satisfy the needs of the population while maintaining financial balance, i.e., doing more with less.

Indeed, NPM offers a range of functional and organic means and tools that enable the desired objectives to be achieved.

The digitalization of the construction permit process in Morocco has been widely embraced by users, as evidenced by the continuous increase in the number of constructions permits issued digitally since the experiment was rolled out in 2019. Similarly, the results of statistical tests confirm the significant negative relationship between the number of applications processed online and the reduction in average processing times.

Thus, based on the seven components of NPM as established by Christopher Hood, we can say that digital transformation is a response to the achievement of New Public Management objectives thanks to its many advantages. In fact, thanks to advances in computer hardware and widespread internet coverage, DT can simultaneously meet the needs of a multitude of users, reducing queues in administrative offices and processing times, and consequently requiring less investment in administrative premises. In addition, the government's digital services demonstrate its openness to citizens, reflect its transparency, and enable direct interaction with users, making it possible to define their needs and how they evolve over time.

Progress in the digitalization of public services represents a major opportunity to simplify and strengthen the relationship between citizens and the administration. By responding to citizens' priority needs in terms of convenience and accessibility, this digital evolution offers concrete solutions. It improves the efficiency of administrative processes by enabling faster responses and simplifying procedures, thereby reducing the number of trips required and the time needed to complete them.

The introduction of digitalized procedures enables electronic traceability of files, giving citizens the transparency, they need to clearly track the progress of their requests. It is crucial

to emphasize that the transition to digital does not preclude direct interaction between citizens and public agents. On the contrary, it is a complementary process in which public services must ensure that digital procedures are integrated smoothly and harmoniously into the overall user experience.

However, administrations must commit to providing user-friendly digital tools, designed to evolve in line with the changing needs and requirements of citizens. Public organizations must also invest in training and support for users and public agents in digital skills to ensure that the digital tools put in place function optimally.

This research has provided an insight into digitalization through the study of a set of fully digitalized administrative procedures for obtaining a construction permit, based on data available since the platform was rolled out nationwide in Morocco in 2019. Other avenues for developing this research are possible, such as studying the digitalization of other administrative procedures, using data from before and after digitalization, etc.

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