

Digital Maturity of Tax Administrations and Fiscal Performance in Emerging Economies: A Conceptual Framework Based on the Moroccan Case

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Abstract:

This paper is theoretical and conceptual in nature: it develops an integrated framework for assessing the digital maturity of tax administrations in emerging economies, without empirical validation, and is intended to guide future empirical work. Building on a narrative review of the literature on digital transformation, information systems, public governance and tax compliance, the study identifies seven constitutive dimensions of digital maturity: technological infrastructure and systems integration, process digitalization and automation, data and analytics capability, governance and strategic alignment, cybersecurity and digital trust, organizational capabilities and human capital, and digital service quality and taxpayer experience. The proposed framework argues that these seven dimensions jointly shape fiscal performance through three mediating mechanisms: administrative efficiency, fiscal intelligence, and tax compliance. The Moroccan tax administration, documented through the General Tax Directorate's (DGI) own activity reports, is mobilized as an illustrative application of the framework within an emerging-economy setting. The paper's contribution lies in a tax-specific maturity model, formalized through seven research propositions, that integrates strands of the information-systems, public-administration and public-finance literatures. Each dimension is further formalized through a dedicated research proposition, and the framework is illustrated by a purpose-built causal diagram linking the seven dimensions, the three mediating mechanisms and fiscal performance. It outlines an agenda for future empirical validation, most notably the development and psychometric validation of a digital maturity measurement scale, to be tested through a comparative survey administered across several tax administrations in emerging economies, together with a discussion of the contextual variables likely to moderate the strength of these relationships.

Keywords: Digital maturity; Tax administration; Fiscal performance; Digital transformation; Tax compliance; Emerging economies; Morocco.

JEL Classification: H26, H83, O33, O38, M15.

Paper type: Theoretical/Conceptual Research

Résumé :

Cet article, de nature théorique et conceptuelle, propose un cadre intégré pour évaluer la maturité numérique des administrations fiscales des économies émergentes ; il ne comporte pas de validation empirique et vise à orienter de futurs travaux empiriques. À partir d'une revue narrative de la littérature portant sur la transformation numérique, les systèmes d'information, la gouvernance publique et la conformité fiscale, la recherche identifie sept dimensions constitutives de la maturité numérique : l'infrastructure technologique et l'intégration des systèmes, la digitalisation et l'automatisation des processus, les capacités de données et d'analytique, la gouvernance et l'alignement stratégique, la cybersécurité et la confiance numérique, les capacités organisationnelles et le capital humain, ainsi que la qualité des services numériques et l'expérience du contribuable. Le cadre proposé soutient que ces sept dimensions contribuent conjointement à l'amélioration de la performance fiscale à travers trois mécanismes médiateurs : l'efficacité administrative, l'intelligence fiscale et la conformité fiscale. Le cas de l'administration fiscale marocaine, documenté à partir des rapports d'activité de la Direction Générale des Impôts, est mobilisé à titre illustratif pour éclairer l'application concrète du cadre dans un contexte d'économie émergente. Cette recherche contribue à la littérature en proposant un modèle spécifiquement adapté au secteur fiscal, formalisé à travers sept propositions de recherche articulant les apports des systèmes d'information, de l'administration publique et des finances publiques. Elle ouvre des perspectives de validation empirique, notamment le développement et la validation psychométrique d'une échelle de mesure de la maturité numérique, destinée à être testée par une enquête comparative auprès de plusieurs administrations fiscales d'économies émergentes.

Mots-clés : Maturité numérique ; Administration fiscale ; Performance fiscale ; Transformation numérique ; Conformité fiscale ; Économies émergentes ; Maroc.

Classification JEL: H26, H83, O33, O38, M15.

Type du papier : Recherche théorique et conceptuelle

1. Introduction

Today, digital transformation is one of the main drivers of modernization for public administrations worldwide. The rapid development of information and communication technologies, the globalization of trade and the increasing complexity of economic transactions compel states to rethink their way of doing things in order to improve the efficiency of public services, strengthen administrative transparency and optimize the mobilization of public resources (OECD, 2018, 2019). In this sense, tax administrations are in a strategic position due to their central role in the financing of public policies and in safeguarding the fiscal sustainability of states.

Tax administration digitalization is part of this wider transformation dynamic. It means the gradual integration of digital technologies into the various functions of tax management, such as tax filing, tax payment, management of taxpayer files, information exchange, tax audits and risk analysis. This evolution exceeds the mere dematerialization of administrative procedures and adopts a broader logic of organizational and informational transformation (Jacobs, 2017; OECD, 2022; Vial, 2019).

There is a substantial literature on the potential benefits of this transformation. Digitalization helps to considerably reduce administrative costs, improve data quality, speed up the processing of tax operations and increase the transparency of interactions between the tax administration and taxpayers (Carter & Belanger, 2005; World Bank, 2016). It also enhances tax compliance by improving data cross-checking capabilities, developing risk-analysis systems, and automating some audit operations (Jacobs, 2017). Allingham and Sandmo (1972) propose that the level of tax compliance is closely related to the administration's ability to reduce information asymmetries and to increase the probability of discovering fraudulent behavior. Recent empirical evidence from developing and emerging economies confirms and refines these theoretical intuitions: Okunogbe and Santoro (2023) review the effects of electronic filing, third-party data matching and analytics on tax collection and compliance across a range of low- and middle-income countries, while Okunogbe and Pouliquen (2022) show, using the introduction of electronic filing in the Democratic Republic of Congo, that digitalization can reduce opportunities for corruption and bribe solicitation, though its revenue effects remain conditional on complementary administrative capacity. In this perspective, digital technologies are an important lever to increase fiscal efficiency.

However, this body of research also points to a set of persistent limitations in the literature on tax digitalization. First, most existing studies focus on isolated tools, such as electronic filing, electronic payment or, more recently, artificial-intelligence-based audit systems, without offering an integrated view of the overall level of digital maturity reached by a tax administration (Vial, 2019; Verhoef et al., 2021). Second, recent literature shows that the success of digital transformation does not depend on the deployment of technological tools alone: many digitalization projects fail or underperform because of governance weaknesses, insufficient human skills, poor information-systems integration, or resistance to organizational change (Bughin et al., 2018; Gil-García & Pardo, 2005; Boamah & Lassey, 2019; Westerman et al., 2014). An administration may therefore operate advanced digital services while still suffering from interoperability gaps, data-quality problems or weak institutional coordination, all of which limit the real impact of digital transformation on overall performance. Third, research devoted specifically to emerging economies remains comparatively scarce, even though these countries face distinct challenges in terms of administrative capacity, financial resources, digital infrastructure and public governance (United Nations, 2024; World Bank, 2022, 2024; Okunogbe & Santoro, 2023). Taken together, these three gaps mean that the literature currently lacks a multidimensional and

integrated framework capable of assessing the overall digital maturity of tax administrations in emerging-economy contexts.

Such a situation requires mobilization of the concept of digital maturity, which allows one to go beyond the strictly technological approach to digitalization. Digital maturity refers to the level of development, integration and adoption of digital capabilities within an organization. This requires not only adequate technological infrastructure, but also integrated processes, analytical capacities, effective governance mechanisms, digital skills and information-security arrangements (Paulk et al., 1993; Ross et al., 2016; Schwab, 2017). This approach is particularly relevant for tax administrations given the complexity of the missions carried out and the strategic importance of the data processed.

The case of Morocco is mobilized in this article as an illustrative application context, rather than as an empirical test, of the conceptual framework developed below. Since the early 2000s, the digital transformation of the Moroccan tax administration has been part of a broader modernization process of public action, initiated through successive national strategies, in particular "Maroc Numeric 2013" (Ministry of Industry, Trade and New Technologies, 2009) and "Maroc Digital 2020" (Ministry of Industry, Trade, Investment and Digital Economy, 2016; Digital Development Agency, 2020). These programs placed great emphasis on the development of e-government, the simplification of administrative procedures and the improvement of digital public services, and were reflected in the tax domain by the progressive deployment of several e-services such as electronic filing, electronic payment, the SIMPL platform and online tax accounts. This illustrative case is used, in section 4, to shed light on how the dimensions and mechanisms identified in the conceptual framework manifest themselves in a concrete emerging-economy setting; it does not constitute an empirical validation of the framework.

The objective of this article is therefore to propose a conceptual framework of digital maturity for tax administrations adapted to the context of emerging economies. More specifically, the research addresses the following central research question: through which dimensions and mechanisms does the digital maturity of a tax administration contribute to improving fiscal performance in an emerging-economy context? This general question is broken down into three specific objectives: (1) to identify and characterize the constitutive dimensions of digital maturity in tax administrations; (2) to specify the mechanisms through which these dimensions translate into improved fiscal performance; and (3) to illustrate the practical relevance of the framework through the Moroccan case.

This article makes three main contributions to the literature, each of which is directly rooted in the architecture of the model developed in section 3. First, it proposes a conceptualization of the tax administration as a specialized public information system based on the collection, processing, and exploitation of tax data (section 2.3). Second, it develops a multidimensional digital-maturity framework built around seven constitutive dimensions and formalized through seven corresponding research propositions (P1 to P7, section 3.3), specifically adapted to tax administrations. Third, it articulates the theoretical links between digital maturity, tax compliance, public-service quality, and fiscal performance through three mediating mechanisms, administrative efficiency, fiscal intelligence and tax compliance (section 3.2 and Table 2).

Methodologically, the conceptual framework proposed in this article is built on a narrative literature review (as opposed to a systematic or bibliometric review), covering the information-systems, public-administration and public-finance literatures published mainly between 1972 and 2024 in peer-reviewed journals and major institutional reports (OECD, World Bank, United Nations). This narrative approach was chosen because the objective of the paper is conceptual integration across disparate literatures rather than an exhaustive,

replicable mapping of a single body of research; this methodological choice, and its limits, are discussed further in the concluding section.

The remainder of the article is organized as follows. Section 2 presents the literature review relating to tax digitalization, tax-administration performance, and digital-maturity models. Section 3 develops the proposed conceptual framework. Section 4 mobilizes the Moroccan case as an analytical illustration. Section 5 discusses the model considering alternative theoretical explanations. Section 6 discusses the theoretical, managerial and public-policy implications of the model, and section 7 concludes with the main contributions, limitations and research perspectives.

2. Literature Review

2.1. Tax Digitalization and Administrative Modernization

The digital transformation of public administrations is now one of the main levers for modernising the action of the public sector. In a context marked by the globalization of trade, the acceleration of technological innovation and the evolution of citizen expectations, administrations are increasingly required to rethink their modes of operation in order to improve their efficiency, transparency and quality of service (Carter & Belanger, 2005; OECD, 2019).

In this context, one of the public organizations most affected by digitalization processes is tax administrations. Digital transformation is a major issue for their performance and their capacity to adapt, given their strategic role in mobilizing public revenue, managing economic information and regulating tax behaviour (Jacobs, 2017; OECD, 2022).

Tax digitalization is the integration of digital technologies in all processes of tax management, from the registration of taxpayers to tax audits, including filing, payment, case processing and information exchange. This evolution is not confined to the dematerialization of administrative procedures: it implies a deeper transformation of organizational arrangements, decision-making processes and the information systems that underpin tax activities (Laudon & Laudon, 2020; World Bank, 2016; Vial, 2019).

The first attempts at tax digitization were mainly directed towards the provision of electronic services to taxpayers, in particular electronic filing and electronic payment. Digital public services enhance the administration's accessibility while reducing the transaction costs incurred by users (Carter & Belanger, 2005). In the tax area, these tools help simplify filing obligations, reduce processing times and improve the quality of interaction between the administration and taxpayers.

Beyond these first-generation services, tax administrations have progressively developed more integrated systems based on electronic case management, process automation, data sharing between public institutions and the use of advanced analytical tools. This evolution expresses a shift from a logic of procedural digitization to a logic of comprehensive digital transformation, in which technology is a core element of administrative functioning (Jacobs, 2017; OECD, 2022).

The literature indicates several advantages of this transformation. On the one hand, digitalization increases operational efficiency by automating many repetitive tasks and reducing manual processing. On the other hand, it fosters better data quality by standardizing the data collected and cutting down on input errors. Finally, it improves the administration's ability to generate, disseminate and use the information needed for decision-making and tax control (World Bank, 2016; OECD, 2022). Cross-country empirical evidence corroborates these mechanisms: Okunogbe and Santoro (2023) find that technology adoption improves tax collection mainly through better identification of the tax base and enhanced monitoring of

compliance, while stressing that facilitation-oriented tools alone rarely generate large revenue gains absent complementary enforcement capacity.

Digitalization is also seen as a tool for strengthening institutional capacities in emerging economies. It can contribute to tackling some forms of fraud, increase transparency and enhance taxpayers' confidence in public institutions by alleviating administrative burdens and improving the traceability of operations (OECD, 2018, 2019). Several studies point out that digital technologies are today an important factor for improving tax governance and mobilizing public revenue.

Yet, the literature also points out that organizational and institutional factors continue to exert a significant influence on the success of digital-transformation projects. As shown by Bughin et al. (2018), obstacles related to organizational change, the governance of digital projects and the availability of skills are often more significant than technological constraints themselves. Similarly, Gil-García and Pardo (2005), and Boamah and Lassey (2019) point to the crucial role of leadership, organizational culture and change management in the success of digital-transformation processes in public organizations, a finding echoed by Westerman et al. (2014) and Verhoef et al. (2021) in the broader digital-transformation literature.

These observations lead to the conclusion that tax digitalization is a multidimensional phenomenon that cannot be evaluated only by the presence of digital services. The presence of e-filing or e-payment platforms is certainly a visible sign of modernization, but it does not necessarily mirror the real degree of integration, coordination and exploitation of digital technologies within the administration. This observation opens the way to the concept of digital maturity, whose objective is to measure the overall capacity of an organization to effectively leverage digital technologies in the service of its strategic objectives.

2.2. Tax Administration, Tax Compliance, and Performance

Tax administrations' performance is a major concern of governments, international organisations and researchers in public finance. Traditionally, this performance has been measured by the administration's ability to effectively mobilize tax revenue to finance public spending. Modern approaches, however, adopt a broader outlook that takes into account operational efficiency, the quality of services rendered to taxpayers, the fairness of the tax system, administrative transparency and the level of tax compliance (OECD, 2022).

Tax compliance is usually defined as the extent to which taxpayers voluntarily comply with their tax obligations regarding filing, payment and the transmission of information. Compliance has long been considered a major determinant of fiscal performance in the economic literature. The seminal work of Allingham and Sandmo (1972) explains taxpayer behavior as being driven by a rational-choice logic in which the decision to evade depends importantly on the probability of audit, the level of penalties and the potential gains from concealing income.

The traditional economic model has been gradually supplemented by more recent approaches that emphasize the importance of behavioral, institutional and organizational factors in tax compliance. Many authors emphasize that taxpayers are not only sensitive to sanction mechanisms but also to the quality of public services, trust in institutions, the perceived fairness of the tax system and the simplicity of administrative procedures (Alm & Wallace, 2004).

From this point of view, the digitalization of tax administrations appears to be a lever capable of improving, at the same time, tax compliance and administrative performance. Digital technologies contribute to reducing taxpayers' compliance costs by simplifying tax procedures. Electronic filing and payment procedures significantly reduce travel needs, reduce processing times, and simplify access to tax services (Jacobs, 2017; OECD, 2022). Okunogbe and Pouliquen (2022) provide direct micro-level evidence of this mechanism: in

the Democratic Republic of Congo, the introduction of electronic filing reduced compliance costs and, importantly, reduced opportunities for bribe solicitation by tax officials, illustrating how digitalization can simultaneously affect compliance costs and the integrity dimension of tax administration governance.

The first channel through which digitalization can affect fiscal performance is by increasing the availability of tax services. If tax obligations are easier to satisfy, taxpayers are more likely to meet their filing and payment obligations. Several studies have shown that the adoption of electronic services is generally associated with an increase in compliance rates and improved user satisfaction (Alm & Wallace, 2004; Carter & Belanger, 2005).

A second mechanism is associated with the improvement of tax information quality. Computers can collect, store and process vast quantities of data from many different sources. This information-processing capacity diminishes the information asymmetries between the administration and taxpayers, while strengthening verification and audit capacity (Jacobs, 2017). Tax administrations thus gain more effective tools to identify inconsistencies, detect risky behavior and channel audit operations toward the situations most likely to present anomalies.

Today, one of the main developments in modern tax management is the increasing use of data. Advanced analytical technologies enable administrations to develop risk-based approaches, improve audit targeting and maximize the use of their resources. This evolution is even more crucial for emerging economies, where the human and financial resources dedicated to tax auditing often remain limited (OECD, 2022).

Digitalization also contributes to the internal efficiency of tax administrations. Automation of repetitive tasks, standardization of procedures and dematerialization of exchanges help reduce administrative costs and improve staff productivity. Freed resources can be redirected toward higher value-added activities such as risk analysis, taxpayer assistance, or complex audit work (World Bank, 2016).

The literature, however, emphasizes that the positive effects of digitalization on fiscal performance are neither automatic nor uniform. Different studies show that technological investments can deliver significant results only if they are accompanied by appropriate organizational transformation, adequate governance, and the development of digital skills (Bughin et al., 2018; Gil-García & Pardo, 2005). An administration may thus have modern technological infrastructure without a lasting improvement in performance if internal processes are fragmented or human capacities are insufficient.

These results suggest that the influence of digitalization on fiscal performance is channeled through a number of organizational and institutional capabilities. This view is directly connected to the concept of digital maturity, which holds that performance is not only a question of the presence of technological tools, but of the organization's overall ability to integrate, coordinate and effectively exploit its digital resources.

Thus, the analysis of fiscal performance requires a multidimensional approach that goes beyond mere revenue-collection indicators to incorporate dimensions related to operational efficiency, tax compliance, service quality, governance, and information capabilities. It is precisely this integrated perspective that justifies the use of a digital-maturity framework applied to tax administrations.

2.3. The Tax Administration as a Specialized Public Information System

In order to analyse the digital transformation of tax administrations, it is necessary to go beyond an approach that focuses only on administrative procedures or visible digital tools. Tax administration is a specialized public information system, whose mission is based on the collection, processing, storage, analysis and exploitation of tax information (Laudon & Laudon, 2020; O'Brien & Marakas, 2011).

The systemic approach to information systems holds that all organizations depend on a structured collection of human, technological and organizational resources that transform data into information useful for decision-making. This informational function is particularly strategic in the case of tax administrations, as the whole tax process relies on the production and use of data concerning taxpayers, income, economic transactions and tax obligations (Laudon & Laudon, 2020).

Tax information systems therefore have several important functions. They enable the collection of the declaratory information provided by taxpayers; they apply various control, validation and cross-checking mechanisms to ensure the processing and verification of this information; and, finally, they provide managers and decision-makers with the information they need to steer tax operations, analyze risks, and plan audit activities (Laudon & Laudon, 2020).

This informational function of modern tax administrations is based on a complex digital architecture made up of interconnected applications, databases and digital platforms. The performance of an information ecosystem, such as e-filing systems, e-payment applications, taxpayer databases, document-management systems, risk-analysis tools and data-exchange platforms, is highly dependent on its degree of integration (OECD, 2022).

In this respect, the concept of integration becomes a key factor of informational performance. According to several authors, the best-performing digital organizations are those that manage to ensure a smooth and coherent flow of information between the different components of their information system (Ross et al., 2016). Conversely, database fragmentation, duplication of data, and a lack of interoperability can result in major inefficiencies, lower the quality of available information, and reduce the organization's ability to make full use of its digital assets.

In the tax field, interoperability is particularly important. Tax administrations have to deal with a number of public and private institutions, such as customs administrations, social-security bodies, banking institutions, local authorities and various regulatory bodies. Efficient exchange and cross-referencing of information is thus a decisive factor in improving tax compliance and combating fraud (OECD, 2019).

This view of information also helps to better understand the growing role of data in contemporary tax modernization strategies. Tax administrations are becoming data-driven organizations thanks to advances in big data, artificial intelligence and advanced analytics. These technologies make it possible to process increasing volumes of information, detect complex patterns of tax behavior and improve the predictive capabilities of audit systems (McKinsey Global Institute, 2016).

Data availability alone, however, does not automatically ensure efficient exploitation. In order to create value from information, the organization must have the right governance mechanisms, data-quality management processes and sufficient analytical skills. As Ross et al. (2016) note, the quality of information-governance processes is as important to digital performance as technological infrastructure itself.

From this viewpoint, the digital transformation of tax administrations cannot be reduced to the adoption of isolated digital technologies. Rather, it fits within a progressive development toward an integrated, intelligent information system capable of supporting the entire spectrum of tax-management activities. This view is directly related to the notion of digital maturity, which precisely aims to assess the level of development, integration and steering of digital capabilities within the organization.

Viewing tax administration as a specialized public information system explains why different digital reforms have produced different levels of performance improvement. The question is not whether digital technologies exist, but whether the administration can combine them into

a coherent architecture that can create reliable, exploitable information and, ultimately, public value.

2.4. Digital Maturity Models: Conceptual Foundations and Application to Tax Administrations

The concept of maturity comes from work on organizational process improvement and the measurement of institutional capability. The first maturity models were created in the field of software engineering to measure the degree of formalization, mastery and optimization of software development processes. One of the most influential models is the Capability Maturity Model (CMM) developed by the Software Engineering Institute, later enhanced through Capability Maturity Model Integration (CMMI) (Paulk et al., 1993).

These models rest on the idea that organizations go through different stages of development. With increased maturity, processes tend to become more structured, integrated, standardized and driven by continuous-improvement mechanisms. The maturity-based approach thus makes it possible to overcome a binary view contrasting high-performing and low-performing organizations, in favor of a gradual logic based on trajectories of organizational development. From the 2000s onward, this approach was progressively transposed to the field of information systems and digital transformation. Several reference frameworks were developed to assess organizations' ability to integrate digital technologies into their strategic and operational activities. IT-governance frameworks such as COBIT notably helped structure information-system management practices around dimensions such as steering, risk management, security, and strategic alignment (ISACA, 2019).

At the same time, consulting firms and research institutes have created a variety of digital-maturity models aimed at measuring the extent of organizations' digital transformation. In the work of Gartner, Deloitte, McKinsey and MIT Sloan Management Review, several recurring dimensions converge: digital strategy, governance, technology, processes, organizational culture, skills and data exploitation (Ross et al., 2016; Bughin et al., 2018).

International organizations have also played a key role in this evolution. Among them, the OECD's Tax Administration 3.0 framework (OECD, 2021) deserves particular attention, as it constitutes the most directly relevant international reference for the object of this article, namely the digital maturity stages of tax administrations. The framework identifies ten building blocks of digitally transformed tax administration (including digital identity, taxpayer touchpoints, data management, and institutional arrangements) and describes a progression from traditional, largely manual tax administration toward a "seamless" model in which tax processes are embedded in taxpayers' natural systems and transactions (OECD, 2021). Table 1 compares the OECD (2021) building blocks, the classic CMM/CMMI and COBIT levels, and the consulting-firm maturity models (Gartner, Deloitte, McKinsey, MIT Sloan) with the seven dimensions retained in the framework proposed in this article. This comparison shows that, while the OECD (2021) framework and the seven-dimension model share a strong emphasis on technological infrastructure, data exploitation and taxpayer-facing service quality, the framework proposed here differs in three respects: it makes cybersecurity and digital trust an explicit, autonomous dimension rather than a cross-cutting design principle; it treats organizational capabilities and human capital as a dimension in its own right rather than an implementation condition; and it formalizes, through seven research propositions, the mediating mechanisms (administrative efficiency, fiscal intelligence, tax compliance) through which maturity translates into fiscal performance, a link that OECD (2021) does not formally model.

Table 1. Comparison of Digital Maturity Reference Models with the Proposed Seven-Dimension Framework

Proposed dimension	CMM / CMMI (Paulk et al., 1993)	COBIT 2019 (ISACA, 2019)	OECD Tax Administration 3.0 (OECD, 2021)	Consulting-firm models (Gartner, Deloitte, McKinsey, MIT Sloan)
Technological infrastructure & systems integration	Process capability levels (implicit infrastructure focus)	Build, Acquire and Implement (BAI) domain	Data management; whole-of-government approach	Technology stack maturity
Process digitalization & automation	Defined / Managed process levels	Deliver, Service and Support (DSS) domain	Taxpayer touchpoints; new skill sets	Process digitization
Data & analytics capability	Not explicitly addressed	Monitor, Evaluate and Assess (MEA) domain	Data management; use of e-ecosystems	Data-driven decision making
Governance & strategic alignment	Optimizing level (institutionalized practices)	Evaluate, Direct and Monitor (EDM) domain	Governance arrangements; institutional framework	Digital strategy and leadership
Cybersecurity & digital trust	Not explicitly addressed	Align, Plan and Organize (APO) domain, security objectives	Digital identity (implicit trust dimension)	Risk and trust management (implicit)
Organizational capabilities & human capital	Institutionalization of practices across the organization	Human resources objectives (APO domain)	New skill sets	Talent and culture
Digital service quality & taxpayer experience	Not explicitly addressed	Not explicitly addressed	Taxpayer touchpoints; seamless tax administration	Customer experience

Source: developed by the authors, based on Paulk et al. (1993), ISACA (2019) and OECD (2021).

But in spite of their value, existing models remain largely generic. They were usually developed for private organizations or for public administrations at large, and therefore do not always adequately reflect the specificities of tax administrations, as Table 1 illustrates.

The tax administration is characterized by a number of particularities. It must collect public revenue, ensure fairness in taxation, provide services to taxpayers, combat fraud, safeguard sensitive data and comply with strict regulatory constraints. This combination of objectives generates specific digital-transformation requirements that are not always mirrored in generic maturity models.

Moreover, recent literature emphasizes that the success of digital transformation in tax administrations rests on a complex set of technological, organizational and institutional factors. The efficiency of tax e-services, automated audit systems, or risk-analysis tools is highly dependent on the quality of digital infrastructure, integration of information systems, data governance, cybersecurity, and staff competencies (Jacobs, 2017; OECD, 2022).

These results support the need for a conceptual framework of digital maturity specifically adapted to tax administrations, as summarized in Table 1. This approach allows one to view digital transformation as a multidimensional process that includes technological infrastructure, operational processes, analytical capabilities, governance, security, organizational competencies and the quality of digital services.

From this perspective, digital maturity can be defined as the extent to which a tax administration is able to leverage its digital resources in a coherent, integrated and secure manner to improve its fiscal performance, service quality, and compliance and audit capacity on a sustainable basis. This definition forms the basis of the conceptual framework developed in the next section.

2.5. Barriers and Critical Success Factors of Digital Transformation in Tax Administrations

The digital transformation literature stresses that the use of new technologies does not automatically lead to improved organizational performance. Many digitalization projects fail because of problems in governance, organization or human resources, leading to delays, cost overruns or under-performance (Bughin et al., 2018; Heeks, 2003).

These difficulties are often exacerbated in the public sector by the complexity of administrative structures, regulatory constraints and the multiplicity of stakeholders involved in reform processes. Digital transformation in the tax area is a very complex process.

Tax administrations have to handle large volumes of information at the same time, ensure continuity of public service, guarantee the security of sensitive data and maintain a high level of trust from taxpayers. The success of this transformation thus depends on a number of technological, organizational and institutional issues that go far beyond the purely technical dimension.

2.5.1. Technological Challenges

The barriers most frequently cited are limitations in technological infrastructure and integration of information systems. In many public administrations, digital systems have been developed progressively through independent projects, resulting in fragmented and poorly interoperable architectures (Ross et al., 2016).

Such fragmentation impedes the flow of information, creates redundancies and reduces the effectiveness of audit and analytical mechanisms. Non-interconnection between the different databases in tax administrations can affect cross-checking operations, limit the possibilities of risk analysis and reduce the overall quality of available information (OECD, 2022).

Data quality is a major challenge as well. Input errors, system mismatches, lack of standardization or gaps in data governance can greatly limit the potential benefits of digitalization. As McKinsey Global Institute (2016) claims, data-driven organizations only fully exploit digital technologies when they have effective mechanisms for managing and valuing information.

2.5.2. Organizational and Human Challenges

In addition to technology, the literature highlights the significance of the human and organizational dimensions of digital transformation. Organizational-change-related challenges are among the main reasons for failure in digital-transformation projects (Bughin et al., 2018). The public sector seems to be fertile ground for resistance to change. The introduction of new digital tools transforms work practices, channels for decision-making and sometimes even power relations within institutions. Such changes can cause anxiety among staff, especially if they are perceived as undermining existing skills or threatening particular jobs (Markus, 1983).

Digital skills matter, too. If staff do not know how to use new tools effectively, a tax administration may have high-performing technology and still not improve its performance. Ongoing training, the development of analytical skills, and change-management support are therefore essential conditions for the success of digital transformation (Boamah & Lassey, 2019).

In addition, the central role of organizational-learning capacity consolidates digital reforms. Broadly speaking, the best-performing administrations are those that succeed in developing a culture of innovation, experimentation, and continuous improvement (Ross et al., 2016).

2.5.3. Governance Challenges

Another important dimension of digital transformation is governance. A number of studies indicate that digital projects are more likely to fail when they are not anchored in a coherent strategic vision or when they are hampered by a lack of coordination among the various actors involved (OECD, 2019).

In tax administrations, digital governance specifically means the definition of clear targets, the right allocation of resources, coordination between business units and IT teams, and the regular monitoring of results. Good governance also helps ensure that technological investments align with fiscal-performance goals.

Leadership is also noted as a key factor in research on digital transformation. Leaders are instrumental in setting the strategic vision, mobilizing resources, and managing resistance to change (Bughin et al., 2018).

2.5.4. Cybersecurity and Digital Trust

The advent of digital technologies further heightens the exposure of tax administrations to cybersecurity risks. Tax systems handle particularly sensitive information on taxpayers' income, assets, financial transactions and tax obligations.

The protection of such data is a major issue for the credibility of tax authorities. Security breaches or data violations can have heavy financial consequences and can also have a lasting impact on taxpayers' trust in the digital services provided (OECD, 2023).

Cybersecurity is therefore not just a technical issue. It is also a key component of digital trust. Taxpayers are more likely to use online services when they believe their personal data is protected and digital systems offer adequate security and reliability.

2.5.5. Toward a Multidimensional Approach to Digital Maturity

The literature review indicates that a set of interdependent dimensions determines the success of digital transformation in tax administrations. Technological infrastructure, systems integration, analytical capabilities, governance, cybersecurity, organizational competencies and digital service quality emerge as complementary factors that condition the effectiveness of the reforms undertaken.

The variety of such explanations reveals the limitations of approaches that focus exclusively on technology. Possessing digital platforms or dematerialized services does not, in itself, make a tax administration digitally mature. Maturity is the ability of the organization to bring together all of its technological, human and institutional resources, in a coherent way, to achieve its strategic objectives.

These observations immediately suggest the need for a multidimensional conceptual framework of digital maturity for tax administrations. Such a framework makes it possible to combine the various factors identified in the literature and to explain their potential effects on fiscal performance.

2.6. Literature Gap and Research Positioning

Studies in recent years indicate growing interest in the digital transformation of tax administrations. There is substantial literature on the impact of electronic filing, electronic payment, electronic-invoicing systems, risk-analysis tools and, more recently, artificial intelligence and Big Data on tax management and taxpayer compliance (Jacobs, 2017; OECD, 2022; OECD, 2023).

A first stream of research has mainly dealt with the operational impacts of tax digitalization. This work shows that the use of digital technologies makes it possible to improve administrative efficiency, reduce processing costs, simplify tax procedures, and strengthen the quality of services provided to taxpayers (Carter & Belanger, 2005; Alm & Wallace, 2004). Other studies highlight the contribution of digital technologies to the improvement of tax-audit capacities, anomaly detection and the fight against fraud through more intensive use of tax data (Jacobs, 2017; OECD, 2023).

A second area of work has grown around the ideas of e-government and public-sector digital transformation. This research shows that the success of digital projects rests not only on technological investment but also on organizational, human and institutional factors such as governance, leadership, organizational culture, and digital skills (Bughin et al., 2018; Gil-García & Pardo, 2005; Boamah & Lassey, 2019).

At the same time, the information-systems literature has produced a range of maturity models to assess the level of digital-capability development in organizations. Models based on the

CMM, CMMI, COBIT, or the frameworks developed by Gartner and MIT Sloan Management Review provide different analytical grids for assessing organizations' progress in their digital-transformation processes (Paulk et al., 1993; Ross et al., 2016).

These contributions are rich, but, taken together, they present four main limitations. First, research devoted to tax digitalization is largely focused on the study of particular technologies or tools considered in isolation, which offers only a partial picture of the overall digital transformation of tax administrations. Second, current research remains fragmented across disciplines: public economics has mainly studied tax compliance and revenue mobilization, public administration has focused on the modernization of public action and service quality, and information-systems studies have concentrated on the technology and organization of digital transformation, which hampers the development of integrated analytical frameworks. Third, existing digital-maturity models, including the OECD's Tax Administration 3.0 framework discussed in section 2.4, were designed mainly for private firms or for public organizations in general and rarely fully capture the specific mix of revenue collection, tax-risk management, taxpayer compliance, audit, data protection and regulatory constraints that characterizes tax administrations. Fourth, research on emerging economies remains limited, even though tax administrations in these countries operate under institutional, infrastructural, governance and human-resource constraints that mean digital-transformation trajectories observed in developed economies cannot be mechanically transplanted to emerging contexts. Finally, the literature has not yet developed conceptual frameworks that can explain, in an integrated manner, how the different dimensions of digital maturity influence fiscal performance. The relationships between technological infrastructure, process digitalization, data exploitation, governance, cybersecurity, organizational competencies and the quality of digital service are not yet sufficiently conceptualized in the specific context of tax administrations.

To address these limitations, this article proposes a multidimensional conceptual framework of digital maturity for tax administrations suited to emerging economies. The framework is based on seven mutually supporting dimensions: technology infrastructure and systems integration, process digitization and automation, data and analytics capability, governance and strategic alignment, cybersecurity and digital trust, organizational capabilities and human capital, and digital service quality.

The original contribution of this research is to bring together contributions from information systems, public administration and public-finance economics in order to propose an integrated view of tax digital transformation. The tax administration is therefore conceived as a specialized public information system whose performance depends on its capacity to coherently mobilize the whole range of its digital, organizational and institutional resources.

This theoretical positioning leads directly to the construction of the conceptual framework presented in the next section.

3. Conceptual Framework of Digital Maturity in Tax Administrations

3.1. Defining the Digital Maturity of Tax Administrations

Digital maturity has emerged as a key concept in the study of organizational digital transformation. Unlike mere digitalization, which mostly refers to the use of technological tools or the dematerialization of some procedures, digital maturity reflects a more advanced level of integration, coordination and exploitation of digital resources within the organization (Paulk et al., 1993; Ross et al., 2016).

This distinction is especially relevant in the context of tax administrations. An administration may offer taxpayers electronic filing or payment services without having a sufficiently integrated digital architecture to durably improve its fiscal performance. Digital maturity thus

entails a deeper transformation that simultaneously involves technological infrastructure, operational processes, data management, governance, human skills and relations with taxpayers.

The digital maturity of a tax administration is defined in this research as:

«The extent to which digital capabilities are developed, integrated, secure and strategically directed to enable a tax administration to improve its administrative performance, audit capacity, tax compliance and quality of services to taxpayers on a sustainable basis.»

This definition highlights four essential characteristics, each of which draws directly on a distinct strand of the literature reviewed in section 2.

First, digital maturity is multi-dimensional: it is not simply a function of the existence of digital technologies or online services, but of the joint development of several complementary capabilities, in line with the maturity-model tradition initiated by Paulk et al. (1993) and extended to digital transformation by Ross et al. (2016) and the OECD's Tax Administration 3.0 framework (OECD, 2021), both of which describe maturity as a multi-component construct rather than a single technological attribute.

Second, it rests on the integration of the different components of the tax information system, echoing the information-systems literature discussed in section 2.3 (Laudon & Laudon, 2020; O'Brien & Marakas, 2011), which shows that the performance of an information ecosystem depends less on the sophistication of any single application than on the coherence and interoperability of the system as a whole (Ross et al., 2016).

Third, it should be evaluated in terms of its impact on fiscal and administrative performance, consistent with the tax-compliance and performance literature reviewed in section 2.2 (Allingham & Sandmo, 1972; Alm & Wallace, 2004; Jacobs, 2017), which anchors digital maturity in outcomes, revenue mobilization, audit capacity, service quality, rather than in the mere adoption of tools.

Finally, it is a progressive process, built through organizational learning and continuous improvement, a characteristic directly inherited from the maturity-stage logic of CMM/CMMI (Paulk et al., 1993) and from the dynamic-capabilities perspective (Teece et al., 1997), according to which an organization's ability to reconfigure its resources over time is itself a source of sustained advantage.

3.2. General Logic of the Proposed Model

The analyses carried out in the previous sections suggest that the performance of tax administrations is a function of several complementary factors.

Digital infrastructure, systems integration and data quality are important (Laudon & Laudon, 2020; Ross et al., 2016) according to the information-systems literature.

Work on tax digitalization highlights the importance of process digitalization, analytical tools and data-based audit mechanisms (Jacobs, 2017; OECD, 2022).

Public-administration research, in turn, stresses the significance of governance, human skills, change management, and the quality of digital public services (Carter & Belanger, 2005; Bughin et al., 2018).

These diverse theoretical inputs lead to a conceptual framework organized around seven interdependent dimensions:

- Technological infrastructure and systems integration
- Process digitalization and automation
- Data and analytics capability
- Governance and strategic alignment
- Cybersecurity and digital trust
- Organizational capabilities and human capital

- Digital service quality and taxpayer experience

The model's central hypothesis is that these dimensions jointly contribute to improving fiscal performance through three mechanisms:

- Administrative efficiency
- Fiscal intelligence
- Tax compliance

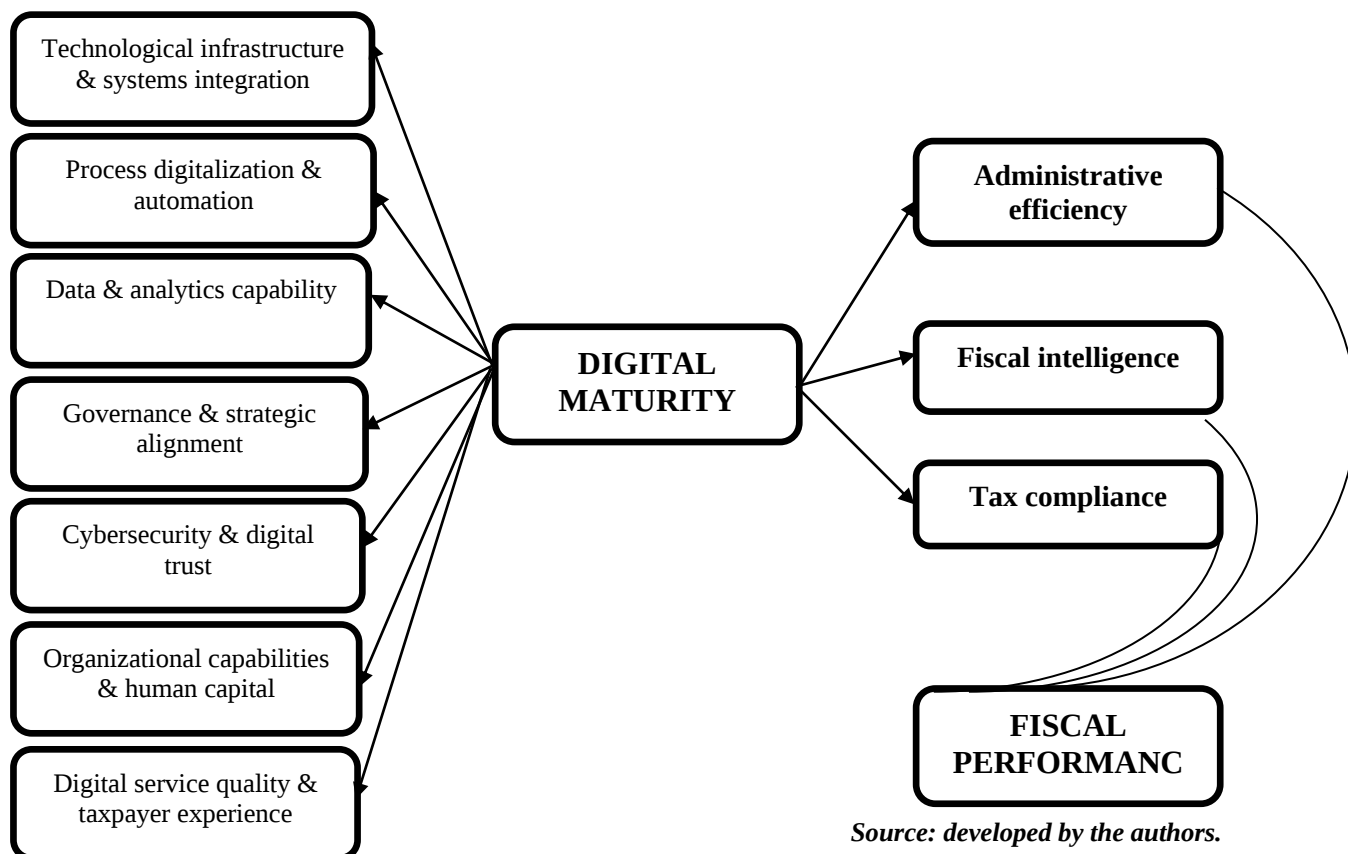
Table 2 maps each of the seven dimensions onto the mediating mechanism(s) it is theoretically expected to feed most directly, based on the mechanism descriptions given in section 5.2. This mapping clarifies the testability of the model for future empirical work: several dimensions are expected to operate through more than one mechanism simultaneously, which is consistent with the interdependent, rather than strictly additive, nature of the seven dimensions.

Table 2. Mapping Between the Seven Dimensions and the Three Mediating Mechanisms

Dimension	Administrative efficiency	Fiscal intelligence	Tax compliance
Technological infrastructure & systems integration	X	X	
Process digitalization & automation	X		
Data & analytics capability		X	
Governance & strategic alignment	X	X	X
Cybersecurity & digital trust			X
Organizational capabilities & human capital	X	X	
Digital service quality & taxpayer experience			X

Source: developed by the authors.

Figure 1. Proposed Conceptual Model of Digital Maturity and Fiscal Performance



Source: developed by the authors.

The model also acknowledges that the strength of the relationships summarized in Table 2 is unlikely to be uniform across all emerging economies. Four contextual moderating variables are expected to influence the intensity of these relationships and should be considered in future empirical tests of the framework: (i) institutional capacity, i.e., the administrative and technical resources available to steer reform (OECD, 2022); (ii) political stability, which conditions the continuity of multi-year digital-transformation programs; (iii) the degree of fiscal decentralization, which affects the coordination requirements between central and local tax authorities; and (iv) the level of development of national digital infrastructure, including broadband coverage and digital-identity systems (World Bank, 2022, 2024; United Nations, 2024). Because the present framework is conceptual, these moderating variables are not tested empirically here; they are proposed as candidate controls for the future comparative validation discussed in section 7.

3.3. The Constitutive Dimensions of Digital Maturity

The literature review shows that the digital maturity of tax administrations results from the combination of technological, organizational and institutional resources. The seven dimensions selected in this study cover the whole spectrum of capabilities considered as determinants of tax digital-transformation processes.

The first three dimensions primarily concern the administration's digital infrastructure and informational capabilities:

- Technological infrastructure
- Process digitalization
- Analytical capabilities

The following two dimensions concern steering and security mechanisms:

- Governance
- Cybersecurity

Finally, the last two dimensions relate to human and relational factors:

- Organizational capabilities
- Digital service quality

This architecture provides a comprehensive view of digital maturity tailored to the particular features of tax administrations in emerging economies.

3.3.1. Technological Infrastructure and Systems Integration

Technological infrastructure is the basic foundation of any digital transformation. It encompasses the hardware, software, and network resources that enable information systems to operate and data to move through the organization (Laudon & Laudon, 2020). For tax administrations, this infrastructure comprises in particular e-filing, e-payment, tax databases, document-management applications, data centres and interconnection with other public institutions.

The quality and coherence of the technological architecture of digital organizations significantly affects their performance (Ross et al., 2016), according to the information-systems literature. When applications are isolated, they create a fragmented infrastructure that restricts the flow of information, increases the risk of data duplication, and reduces the organization's ability to capitalize on the value of its digital assets. An integrated architecture, on the other hand, promotes interoperability, increases data quality and enables the coordination of activities.

In tax administrations, systems integration is of particular importance due to the complexity of the information flows involved in the tax process. The processing of filings, payments, audits, disputes and collection involves a constant exchange of information between the different departments and, at times, between several public institutions. Inadequate integration

of infrastructure may lead to inconsistencies, slow down processing and reduce the efficiency of tax-audit operations (OECD, 2022).

Moreover, recent reforms in tax administrations increasingly rely on the ability to exchange data with external partners such as customs administrations, social-security bodies, banking institutions and local authorities. Interoperability therefore becomes a critical factor of modernization and fiscal performance, strengthening information cross-checking mechanisms, reducing information asymmetries and helping to better detect risky behaviour (OECD, 2019).

The theoretical review conducted in section 2 also shows that a large part of the difficulties faced in digital-transformation projects relates to the existence of heterogeneous systems, developed progressively and sometimes insufficiently coordinated. Such situations restrict the overall coherence of the tax information system and decrease the expected benefits of digital investment.

Technological infrastructure is thus a prerequisite for digital maturity. It does not necessarily lead to better fiscal performance on its own, but it creates the essential foundations for the development of the other dimensions of maturity, including process automation, data exploitation and the deployment of high-performing digital services.

In this respect, a tax administration with a high level of digital maturity is one with an integrated, interoperable and scalable technological architecture, capable of effectively supporting the full range of tax activities.

Research Proposition 1: P1: The more integrated the tax information systems and technology infrastructure, the more efficient and effective the administration's fiscal performance.

3.3.2. Process Digitalization and Automation

The digitalization of processes is the use of digital technologies across the full scope of the tax administration's operational activities, replacing or transforming traditional manual procedures. It notably comprises tax filing, tax payment, taxpayer case management, complaint processing, audit scheduling, collection and information exchange between administrative departments (Jacobs, 2017; OECD, 2022).

At its most basic, digitalization means dematerializing processes that used to be done on paper. Studies of digital transformation suggest, however, that simply going paperless will not deliver large performance gains. The greatest benefits appear to be realized when processes are redesigned, simplified, and gradually automated through digital technologies (Ross et al., 2016).

Process automation reduces manual intervention, minimizes processing errors and speeds up operations. In the tax area, such automation can cover many activities, including validating filings, issuing tax assessments, following up on payments, producing administrative documents, or certain stages of audit planning (OECD, 2022).

Studies on e-government highlight that process digitalization plays a direct role in enhancing administrative efficiency. It reduces processing times and management costs, allowing administrations to reallocate human resources toward higher value-added activities such as risk analysis, targeted audits and taxpayer support (Carter & Belanger, 2005; Jacobs, 2017).

In the field of taxation, automation is also of interest for the quality and traceability of operations. Digital processes generate detailed transaction histories and facilitate the tracking of tax files. This traceability enhances administrative transparency and strengthens the internal audit capacity of the administration (OECD, 2022).

The Moroccan case, discussed in more detail in section 4, exemplifies this evolution: the development of the SIMPL platform, electronic filing and electronic payment has dematerialized a significant share of the interactions between taxpayers and the tax

administration. These tools have helped simplify tax procedures, shorten processing times and increase the accessibility of tax services. Nevertheless, the theoretical review conducted above also highlights that the digitalization of procedures does not necessarily ensure the full integration of internal processes or a deep organizational transformation.

Thus, the literature suggests that the most mature administrations are not necessarily those with the largest number of e-services, but those able to coherently integrate and automate the entire set of their operational processes. Automation should be seen as a means of complete transformation rather than simply a technical enhancement of existing procedures.

Automation also provides a pathway for the evolution of analytical capabilities: digital processes generate large amounts of structured data that can subsequently be used for risk analysis, tax auditing or decision support. Process digitalization is thus an important intermediate stage between technology infrastructure and the analytical capabilities of the tax administration.

Seen from this perspective, the digital maturity of a tax administration is a function not only of the availability of digital services but also of the extent to which its internal processes are automated, integrated and optimized.

Research Proposition 2: P2: The extent of digitalization and automation in tax processes is positively associated with administrative efficiency and the quality of tax services.

3.3.3. Data and Analytics Capability

The pace of digital transformation has changed how tax administrations generate, collect, and use data. While traditional tax systems focused predominantly on administrative and accounting processing, modern tax administrations are increasingly becoming data-driven organizations, in which information is a strategic resource vital to decision-making (McKinsey Global Institute, 2016; OECD, 2023).

In this context, data and analytics capability is defined as the capability of a tax administration to collect, integrate, process, analyze and leverage tax data to improve its management, audit and decision-making processes. This capacity depends on data availability, the quality of information systems, and the existence of analytical skills able to turn data into knowledge useful for public action (Laudon & Laudon, 2020).

Data is now considered a strategic asset, comparable to financial or human resources, in the information-systems literature. This is particularly true for tax administrations, whose entire activity rests on the use of information about taxpayers, income, economic transactions and tax obligations. The quality and exploitation of this data directly determine the efficiency of audit operations, fraud detection and public-revenue mobilization (Jacobs, 2017).

Progress in big data, artificial intelligence and machine learning has significantly expanded the opportunities for using tax information. Tax authorities today have access to increasing volumes of data from a variety of sources, including tax returns, electronic transactions, banking data, administrative registries and digital platforms. The challenge is no longer just to store this information, but to analyze it in order to extract knowledge useful for tax management (Agrawal et al., 2018; OECD, 2023).

Tax-risk analysis is one of the main applications of these analytical capabilities. Through sophisticated data-processing techniques, administrations are able to identify taxpayers who are likely to be non-compliant, detect inconsistencies in filings and target audit operations more effectively. This strategy optimizes the use of audit resources and enhances the likelihood of detecting fraudulent behavior (Allingham & Sandmo, 1972; Jacobs, 2017).

Moreover, data exploitation helps reduce information asymmetries between the tax administration and taxpayers. According to the economic theory of tax compliance, these asymmetries are among the main factors that lead to fraud and tax evasion (Allingham &

Sandmo, 1972). Analytical technologies thus enhance the administration's capacity to collect, cross-reference and analyze information, thereby helping to improve tax compliance.

Value creation from data, however, does not rest solely on the technologies used. Several authors point out that analytical performance also depends on the quality of available data, the existence of information-governance mechanisms, and the analytical skills of human resources (Ross et al., 2016). An administration can hold a large amount of data and yet be unable to exploit it if that data is incomplete, scattered or insufficiently integrated.

This challenge is particularly important for tax administrations in emerging economies, where the exploitation of advanced analytical technologies can be constrained by data-quality limitations, systems interoperability gaps, and a shortage of specialized skills. The development of data and analytics capability thus appears as a key element of digital maturity. This dimension plays a pivotal role in the proposed model, as it is the main mechanism through which digital infrastructure and digitalized processes are converted into fiscal intelligence. A mature administration can not only generate data, but also convert it into strategic information that improves tax compliance, the quality of decisions and the overall performance of the tax system.

Research Proposition 3: P3: The higher the maturity of the tax administration's data and analytics capability, the higher its audit capacity, tax compliance and fiscal performance.

3.3.4. Governance and Strategic Alignment

Digital governance is an important part of an organization's digital maturity. It comprises the set of mechanisms, processes and structures used to guide, steer and control digital initiatives, so as to ensure their coherence with the organization's strategic objectives (ISACA, 2019; Ross et al., 2016).

The use of digital technologies in tax administrations goes well beyond the management of technological infrastructure. It involves defining a clear strategic vision for digital transformation, coordinating across administrative units, providing the required resources, and constantly evaluating results achieved, so as to ensure that digital investments effectively contribute to improving fiscal performance and modernizing the administration.

The literature on digital transformation stresses that strategic alignment is one of the key conditions for the success of digital projects. According to Ross et al. (2016), the best-performing organizations are able to align their technology investments with their strategic priorities and operational objectives. Conversely, the benefits of digital projects are often limited when projects are built in isolation or without an overarching vision.

In the tax area, this coordination is especially necessary because of the diversity of tasks assigned to the administration. Digital systems must simultaneously support revenue collection, tax auditing, dispute management, taxpayer service, and the production of information for public decision-makers. This functional diversity requires strong coordination among departments to avoid the fragmentation of digital initiatives and the proliferation of incompatible solutions.

The theoretical review conducted above also shows that the digital transformation of the tax administration takes place in a complex institutional environment, involving multiple stakeholders: government authorities, public administrations, taxpayers, businesses, financial institutions and technology partners. In this respect, governance plays a central role in mediating between the interests of the various actors and in coordinating modernization projects.

Furthermore, research on e-government shows that leadership is a decisive factor for the success of digital transformations. Leaders should not only endorse digital projects but also promote a culture of innovation, cross-departmental collaboration and support for the

organizational changes induced by new technologies (Carter & Belanger, 2005; Bughin et al., 2018).

Digital governance also raises resource- and risk-management issues. Tax administrations have to arbitrate between different technological projects, define investment priorities and put in place monitoring mechanisms to assess the effectiveness of the initiatives undertaken. Effective governance thus reduces the risk of digital-project failure and maximizes the creation of public value.

OECD (2023) finds that the most developed tax administrations are those that have formalized digital strategies, clear steering mechanisms and strong integration of fiscal and digital objectives. These administrations treat digital transformation as a permanent part of their institutional strategy rather than as a one-off technological project.

The proposed model gives a transversal role to governance and strategic alignment. This dimension directly affects the administration's ability to build its digital infrastructure, automate its processes, make the most of its data and raise the quality of its services. A digitally mature tax administration is therefore one able to steer digital transformation in a coherent and coordinated way, with an orientation toward the creation of public value.

Research Proposition 4: P4: The more mature the tax administration's digital governance and strategic alignment, the higher its administrative efficiency and overall fiscal performance.

3.3.5. Cybersecurity and Digital Trust

Cybersecurity has become essential to the digital transformation of public organizations. It refers to all policies, mechanisms, technologies and procedures put in place to protect information systems, digital infrastructure and data from the risk of unauthorized access, loss, disclosure, alteration or service disruption (ISACA, 2019; OECD, 2023).

Tax administrations handle sensitive information, which makes cybersecurity particularly relevant. Tax systems hold information on the income, assets, financial transactions, economic activities and tax obligations of millions of taxpayers. This information constitutes a strategic asset whose protection is necessary for the proper functioning of the administration and the preservation of public trust.

Digital transformation, according to the information-systems literature, simultaneously increases organizations' opportunities and vulnerabilities. The increasing interconnection of systems, the volume of data exchanged and the development of online services enlarge the surface of exposure to cyber threats. Tax administrations are therefore exposed to the risk of cyberattacks, digital fraud, identity theft, ransomware and data leaks (OECD, 2023).

Cybersecurity is also, beyond its technical dimension, at the heart of building digital trust. According to Carter and Belanger (2005), the uptake of digital public services largely depends on users' perception of the security and reliability of the systems offered. Taxpayers are more likely to use digital platforms when they feel that their personal data is protected and that online transactions are secure.

The relationship between security and trust is particularly important in taxation. Electronic filing, payment or tax-account consultation services involve confidential information and, at times, sensitive financial data. Any security failure could have significant implications not only for administrative operations but also for the credibility of the tax administration.

International organizations also highlight that digital trust has become an important success factor for the digital-transformation strategies of tax administrations. The OECD (2023) identifies cybersecurity as one of the fundamental pillars of modern tax administrations, alongside data quality, process automation, and analytical capabilities.

Furthermore, cybersecurity contributes directly to the continuity of administrative activities. Security incidents that result in service disruptions can affect tax operations, slow the

processing of filings and hinder the quality of services provided to taxpayers. A digitally mature tax administration must therefore be able to effectively prevent, detect and manage digital risks in order to ensure the availability and integrity of its systems.

The theoretical review conducted above further shows that trust is an important element of the relationship between the tax administration and taxpayers. In an increasingly digital environment, this trust rests partly on the administration's capacity to demonstrate the reliability of its infrastructure, the confidentiality of the data it collects and the robustness of its security arrangements.

In the proposed model, cybersecurity and digital trust are characterized as a cross-cutting capability underpinning all the other dimensions of digital maturity. It promotes the use of digital services, enhances the quality of information sharing and helps make digital tax arrangements legitimate.

Research Proposition 5: P5: The higher the level of cybersecurity and digital trust, the higher the uptake of digital services and the digital maturity of the tax administration.

3.3.6. Organizational Capabilities and Human Capital

The success of the digital transformation of tax administrations relies not only on the technologies implemented but also on organizations' ability to mobilize, develop and adapt their human resources to the changes brought about by digital innovation. This organizational capability is one of the most important factors in the success of digital-modernization projects today (Bughin et al., 2018; Ross et al., 2016).

Organizational capabilities are defined as the full range of skills, knowledge, routines and learning mechanisms that allow an organization to use its resources effectively to achieve its strategic objectives (Teece, Pisano, & Shuen, 1997). In the context of digital transformation, these capabilities include, in particular, staff digital skills, training arrangements, change-management mechanisms and organizational-innovation capacity.

These are matters of particular concern to tax administrations. New digital systems radically change the nature of work, information channels and how staff relate to taxpayers. Staff therefore need to acquire new skills in the use of digital technologies, data exploitation, risk analysis and the management of dematerialized platforms.

Several studies point out that a lack of adapted skills is one of the main obstacles to the success of digital-transformation projects. Bughin et al. (2018) argue that the difficulties faced in digitalization projects are often related to human and organizational problems rather than technological limitations. An administration can have state-of-the-art infrastructure and still not achieve strong performance if its staff do not master the tools deployed or if the necessary organizational changes are not well supported.

The theoretical review conducted above also emphasizes the importance of resistance to change in administrative-modernization processes. Digital transformations can alter professional practices and organizational responsibilities, generating uncertainty among staff. Managing this resistance is a major challenge for the success of digital reforms.

From this point of view, continuous training appears as an essential lever for the development of digital maturity. Tax administrations need to invest in stronger technical, analytical and managerial skills to enable staff to fully exploit new technologies. Training programs encourage the use of digital tools and the development of a culture of learning and innovation. The literature points to the importance not only of individual skills but also of organizational learning. Digitally mature organizations are generally characterized by their ability to leverage past experience, share knowledge and continually adapt their practices in response to technological and environmental changes (Ross et al., 2016). This adaptability is of special interest in the tax field, where administrations must deal with the fast evolution of economic models, technologies and taxpayer behaviours.

Organizational capabilities also play a mediating role in the relationship between digital investment and performance outcomes. Technologies create value only when incorporated into coherent organizational processes and supported by human resources capable of using them efficiently. Human capital is thus a necessary ingredient of digital maturity in tax administrations.

This dimension of the proposed model refers to the administration's ability to develop the skills, learning mechanisms, and organizational practices necessary for the long-term success of its digital transformation.

Research Proposition 6: P6: The higher the level of organizational capabilities and human capital developed, the higher the digital maturity of the tax administration.

3.3.7. Digital Service Quality and Taxpayer Experience

Today, the quality of digital services is one of the main dimensions of the digital transformation of public administrations. In the tax domain, it refers to the administration's capacity to provide electronic services that are accessible, reliable, user-friendly, secure and tailored to the needs of taxpayers (Carter & Belanger, 2005; OECD, 2022).

The development of digital technologies has fundamentally changed the expectations of citizens and businesses toward public administrations. Taxpayers are now looking for services that are always available, accessible remotely, and able to simplify the fulfilment of their tax obligations. In this respect, the quality of the user experience is a decisive factor in the adoption of digital services and the effectiveness of administrative-modernization policies.

The literature on e-government suggests that the adoption of digital public services is significantly influenced by the perceived usefulness, ease of use, and reliability of these services (Carter & Belanger, 2005). Taxpayers are more likely to use digital platforms when they find that these platforms save them time, reduce their administrative costs and simplify their dealings with the administration.

In the tax domain, digital service quality is reflected in a number of complementary dimensions, including the availability of electronic platforms, the simplicity of procedures, the speed of processing applications, the availability of information, the quality of customer service and the continuity of services provided. A good user experience encourages the use of e-services and helps strengthen the relationship between the tax administration and taxpayers. Research on tax compliance has also demonstrated the direct impact of service quality on taxpayer behavior. Taxpayers are more likely to comply voluntarily with their tax obligations when procedures are perceived as simple, transparent and easy to meet (Alm & Wallace, 2004; Jacobs, 2017). Conversely, complex procedures or low service quality can increase compliance costs and discourage the use of digital tools.

As discussed in more detail in section 4, the development of tax e-services in Morocco fits this logic of improving the taxpayer experience: the progressive generalization of electronic filing, electronic payment and associated digital services is intended to facilitate administrative procedures and improve the quality of interactions between the tax administration and users.

The quality of digital services is also significant in establishing institutional trust. Strong, transparent and reliable services help strengthen the credibility of the tax administration and improve the perception of its effectiveness. This trust, in turn, encourages the use of digital tools and the development of a more collaborative relationship between the administration and taxpayers.

In the proposed model, digital service quality forms the most visible dimension of digital maturity from the users' point of view. It is the operational culmination of investments in technological infrastructure, digital processes, analytical capabilities, governance,

cybersecurity and skills development. A digitally mature tax administration can thus convert its digital resources into high-value-added services for taxpayers.

Research Proposition 7: P7: The better the quality of digital services and taxpayer experience, the better the tax administration's tax compliance and fiscal performance.

The literature review has made it possible to identify seven interrelated dimensions that make up the digital maturity of tax administrations: technological infrastructure and systems integration, process digitalization and automation, data and analytics capability, governance and strategic alignment, cybersecurity and digital trust, organizational capabilities and human capital, and digital service quality and taxpayer experience. Together, these dimensions form an integrated conceptual framework explaining how digital capabilities contribute to improving fiscal performance in emerging economies.

4. Morocco as an Illustrative Case of Digital Transformation in Tax Administration

4.1. Evolution of the Digital Transformation of the Moroccan Tax Administration

During the last two decades, Morocco has undergone a substantial process of modernization of its public administration through the gradual integration of digital technologies into public services. This dynamic is at the heart of several national strategies for the promotion of the digital economy, the improvement of the quality of administrative services and the strengthening of the effectiveness of public action, in particular "Maroc Numeric 2013" (Ministry of Industry, Trade and New Technologies, 2009) and "Maroc Digital 2020" (Ministry of Industry, Trade, Investment and Digital Economy, 2016; Digital Development Agency, 2020), as well as a number of reforms related to e-government and the digital transformation of the state.

In this context, the Moroccan tax administration has gradually embarked on a process of digitalizing its activities in order to better manage tax revenue, simplify administrative procedures and reinforce relations with taxpayers. This transformation has resulted in the gradual development of a set of e-services covering the main tax operations.

One of the most important achievements is the establishment of the SIMPL platform, which today constitutes the main digital portal of the General Tax Directorate (DGI). The platform allows taxpayers to carry out various tax operations online, such as filing, paying taxes, checking tax accounts, and monitoring administrative procedures.

This progression can be documented through the DGI's own annual activity reports. The obligation to file and pay electronically was introduced progressively, starting in 2015 for companies with turnover above 50 million dirhams and generalized to all taxpayers by 2017 (DGI, Rapport d'activite 2016). By 2021, the number of dematerialized operations reached 18.82 million, a 32% increase over 2020 and more than seven times the 2016 volume, with tele-payments and tele-declarations together accounting for about 72% of dematerialized operations (DGI, Rapport d'activite 2021). In 2022, the number of SIMPL subscribers rose by 22% to reach 1,882,099 users, total dematerialized operations reached 212 million (+13% year-on-year), of which 87% corresponded to tele-declarations, tele-payments and the retrieval of tax certificates; the share of tax revenue collected through tele-payment rose from 91.2% in 2021 to 91.5% in 2022 (DGI, Rapport d'activite 2022). By 2025, this share of tele-paid revenue had reached 91.4% of total tax revenue, more than double the 7.29 million tele-payment operations recorded in 2020 (DGI, Rapport d'activite 2025). These figures, drawn directly from the DGI's own published activity reports, provide the minimal empirical grounding this illustrative case requires and directly document the evolution addressed in section 4.2.

The gradual introduction of electronic filing and electronic payment was a major step in modernizing the Moroccan tax administration. These tools have reduced the limitations of physical travel, eased administrative processes and improved the accessibility of tax services for individuals and businesses.

This evolution illustrates the progressive transition from a logic of procedural dematerialization to a broader perspective on digital transformation focused on the integration of technologies into tax-management activities.

4.2. Achievements and Progress in Tax Digitalization in Morocco

The Moroccan experience suggests several major advances in tax digital transformation.

First, digitalization has increased accessibility to tax services. The taxpayer can now fulfil a large part of his or her tax obligations remotely, which reduces transaction costs and improves the quality of contacts with the administration. As noted in section 4.1, this accessibility gain is reflected in the sustained growth of SIMPL subscribers, which reached close to 1.9 million users by 2022 (DGI, Rapport d'activite 2022).

Second, the gradual automation of procedures has reduced the processing times of certain administrative operations and increased the efficiency of internal processes. The dematerialization of filings and payments has notably contributed to reducing manual processing and strengthening the reliability of the data collected, as illustrated by the fact that tele-payment alone accounted for over 91% of tax revenue collected by 2022 (DGI, Rapport d'activite 2022).

Third, the development of digital systems has increased the availability of tax information. Electronic platforms offer faster access to the information necessary for managing tax files and audit missions.

Fourth, digital tools have allowed for greater transparency and traceability in tax operations. Taxpayers now have a better overview of the status of their procedures and of the operations carried out within the tax system.

These achievements highlight the increasing importance of digital technologies in the modernization of the Moroccan tax administration. They reflect several dimensions of the digital-maturity model proposed in this research, in particular technological infrastructure, process digitalization and digital service quality.

4.3. Persistent Challenges of Tax Digital Transformation

However, despite the progress made, the digital transformation of the Moroccan tax administration still faces challenges that echo the observations made in the international literature.

One of the first challenges concerns the integration of information systems. As in many public administrations, the coexistence of different applications and databases may hinder the fluidity of information exchange and reduce the expected benefits of digitalization.

A second challenge concerns data governance and its analytical exploitation. Digitalization is producing increasing volumes of tax information; however, turning this information into intelligence for decision-making requires analytical capabilities, specialized skills and adapted governance mechanisms.

Cybersecurity is also a major concern. The rise of digital exchanges and the increasing centralization of tax data highlight the need to protect information systems and secure taxpayer data.

Further, the development of digital skills remains a key success factor. The success of digital reforms largely depends on the ability of staff to master new tools and adapt their professional practices to technological developments.

Finally, the digital divide continues to be a major challenge. Not every taxpayer has the same access to digital technologies or the same skills to use online services, which can limit the potential benefits of some digitalization projects.

4.4. Lessons for Emerging Economies

The Moroccan experience provides several lessons for the tax administrations of emerging countries involved in digital-transformation processes, each of which maps onto a specific dimension of the proposed framework rather than remaining at a purely general level.

First, mapped onto the technological-infrastructure and process-digitalization dimensions (P1, P2), the Moroccan trajectory shows that tax digitalization is an important lever for improving administrative efficiency and modernizing relations with taxpayers, but that these gains materialize gradually and depend on the prior generalization of a unified platform such as SIMPL rather than on isolated e-services.

Second, mapped onto the governance and organizational-capabilities dimensions (P4, P6), the Moroccan case reaffirms that successful digital transformation is not only a matter of technological investment: governance arrangements, human skills, cybersecurity and systems-integration issues appear equally decisive, and their comparative weakness relative to the technological dimension is precisely what the persistent challenges identified in section 4.3 illustrate.

Third, mapped onto the data-and-analytics and digital-service-quality dimensions (P3, P7), the Moroccan experience highlights the need for a progressive and coherent approach to digital transformation. For administrations at an early stage of maturity, the priority recommendation is to consolidate a single integrated platform before expanding analytical capabilities; for administrations at an intermediate stage, closer to the Moroccan case, the priority shifts toward strengthening data governance and cybersecurity; for more advanced administrations, the priority becomes the systematic use of analytics for risk-based auditing.

Finally, the Moroccan case demonstrates the relevance of the conceptual framework proposed in this research. The various challenges and achievements observed can be discussed through the seven identified dimensions of digital maturity, confirming the relevance of a multidimensional approach for assessing the digital transformation of tax administrations.

Analysis of the Moroccan case shows that the digital transformation of tax administrations is a complex process that mobilizes technological, organizational and institutional resources simultaneously. These observations confirm the relevance of the seven dimensions retained in the proposed conceptual framework. The following section discusses the model's theoretical implications, considering alternative theoretical explanations, before section 6 turns to its managerial and public-policy implications.

5. Discussion

5.1. Theoretical Contributions of the Proposed Model

This study aimed to develop a conceptual framework to assess the digital maturity of tax administrations in emerging economies. The literature analysis shows that tax digital transformation cannot be understood solely through the adoption of technologies or the introduction of e-services. It is the product of a set of technological, organizational and institutional capacities that interact in shaping fiscal performance.

The main theoretical contribution of this research is the proposal of a multidimensional approach to digital maturity, applied to the case of tax administrations. Unlike most existing work, which separately analyzes electronic filing, electronic payment, risk-analysis systems, or electronic audit tools, the proposed model considers digital transformation as a global phenomenon that integrates seven interdependent dimensions.

This approach makes it possible to go beyond the fragmentation observed in the literature between research in information systems, public administration and public finance, thereby contributing to the construction of a more integrated analytical framework for the digital modernization of tax administrations.

Furthermore, the article offers an original conceptualization of the tax administration as a specialized public information system. This view highlights the importance of data, systems integration, and analytical capabilities in generating public value and enhancing fiscal performance.

The proposed framework is deliberately built as one possible reading among several competing theoretical lenses on why digital-transformation outcomes vary so much across tax administrations. Neo-institutional theory (DiMaggio & Powell, 1983) offers a complementary explanation: tax administrations may adopt similar digital tools less because of demonstrated performance gains than through coercive pressure from international organizations, mimetic imitation of peer administrations, or normative pressure from the accounting and auditing profession. This lens helps explain why formally similar platforms (e.g., unified e-filing portals) can coexist with very different levels of the organizational and governance dimensions identified in section 3.3, since isomorphic adoption pressures act primarily on visible, technological dimensions rather than on the less visible organizational capabilities. Contingency theory (Donaldson, 2001), for its part, suggests that no single configuration of the seven dimensions is optimal in all circumstances: the relative weight of governance versus technological infrastructure, for instance, is likely to be contingent on the administration's institutional environment, its degree of centralization, and the volatility of its regulatory context. These two theoretical lenses do not replace the resource- and capability-based reasoning underlying the seven-dimension model (grounded in the dynamic-capabilities perspective of Teece et al., 1997); rather, they help explain the heterogeneity of digital maturity trajectories that a purely capability-based model would otherwise struggle to account for, and they point to institutional and contingency variables that future empirical work could add to the moderating variables already discussed in section 3.2.

Finally, this research contributes to the literature on digital maturity by tailoring the concept to the specificities of tax administrations. Existing maturity models have generally been developed for private companies or for public organizations in general. The proposed framework considers the specific missions of tax administrations, such as revenue collection, tax auditing, compliance management and the protection of sensitive data.

5.2. Digital Maturity and Fiscal Performance: A Multidimensional Relationship

The three mediating mechanisms through which digital maturity is theorized to influence fiscal performance, administrative efficiency, fiscal intelligence and tax compliance, were introduced and mapped onto the seven dimensions in section 3.2 (see Table 2). Rather than repeating that discussion, this subsection focuses on what the mapping implies for the overall relationship between maturity and performance.

One of the key lessons from this research is that the link between digital transformation and fiscal performance is more complex than a straightforward link between technology and outcomes. The analyses carried out show that technological infrastructure and process digitalization are necessary but not sufficient conditions for improving fiscal performance. The benefits of digital transformation also depend on the administration's ability to harness its data, sustain effective governance, safeguard its information systems, develop the skills of its workforce, and provide high-quality digital services.

This observation is consistent with the findings of several recent studies showing that the highest-performing organizations are those that manage to effectively articulate the

technological and organizational dimensions of digital transformation (Ross et al., 2016; OECD, 2023).

As Table 2 shows, governance and strategic alignment is the only dimension expected to feed all three mechanisms simultaneously, which is consistent with its transversal role emphasized in section 3.3.4; conversely, cybersecurity and digital trust, and digital service quality, are expected to operate mainly through tax compliance, since their effect on performance runs primarily through taxpayer behavior rather than through internal administrative efficiency.

5.3. Discussion of the Moroccan Case

The Moroccan case study confirms the relevance of this multidimensional approach. The development of the SIMPL platform, electronic filing and electronic payment shows progress on the dimensions related to technological infrastructure and process digitalization.

But the Moroccan experience also shows that the challenges of digital transformation are much more extensive than the mere introduction of electronic services. The success of the reforms undertaken continues to depend on issues such as systems integration, data governance, cybersecurity, skills development and the continuous enhancement of digital services.

This observation is evidence that digital maturity should be considered a developing process, rather than a state reached once technologies are deployed.

6. Research Implications

6.1. Theoretical Implications

This research makes several contributions to the literature on public-sector digital transformation and tax management.

First, it offers a conceptualization of the tax administration as a specialized public information system, whose performance is based on the collection, processing, analysis and exploitation of tax data. This perspective moves beyond the traditional view of the tax administration, often restricted to its revenue-collecting function, to show the strategic importance of informational capabilities for the creation of public value.

Second, the study proposes a multidimensional conceptual framework for digital maturity specifically designed for tax administrations. Existing literature in the field has mostly focused on particular technologies or generalized maturity models, but the framework presented here covers seven complementary dimensions: technological infrastructure and systems integration, process digitalization and automation, data and analytics capabilities, governance and strategic alignment, cybersecurity and digital trust, organizational capabilities and human capital, and digital service quality and taxpayer experience.

Third, this study contributes to integrating several theoretical streams from information systems, public administration, and public-finance economics. It analyses the channels through which digital maturity can affect fiscal performance by enhancing administrative efficiency, fiscal intelligence and tax compliance.

Finally, the study fills a gap in the literature on emerging economies, where research devoted to the digital maturity of tax administrations remains scarce despite the acceleration of digital-transformation processes observed in recent years.

6.2. Managerial Implications

The findings of this research carry a number of implications for public decision-makers and tax administration officials.

They first indicate that the success of digital transformation does not depend on technological investment alone. Tax administrations need to adopt an integrated approach that

simultaneously combines digital infrastructure, organizational processes, analytical capabilities, governance, cybersecurity and human-skills development.

Second, the proposed framework can be used as a diagnostic tool allowing tax administrations to assess their level of digital maturity and identify the dimensions requiring priority improvement. To make this diagnostic use more concrete, the framework can be translated into discrete maturity stages for each dimension, following the same logic as the CMM/CMMI tradition discussed in section 2.4. Level 1 (Initial) corresponds to isolated, largely manual or paper-based operations with no formalized digital strategy; Level 2 (Emerging) corresponds to the deployment of first-generation e-services (electronic filing and payment) without systems integration, comparable to the situation described for the initial phase of the Moroccan SIMPL rollout in section 4.1; Level 3 (Developing) corresponds to an integrated technological platform combined with partial process automation and an emerging data-governance function, broadly consistent with the Moroccan case as documented in sections 4.2 and 4.3; Level 4 (Advanced) corresponds to systematic use of analytics for risk-based auditing, formalized digital governance, and measured cybersecurity and service-quality standards; and Level 5 (Optimized) corresponds to a fully interoperable, data-driven administration where continuous improvement mechanisms operate across all seven dimensions simultaneously, comparable to the "seamless" tax administration described in the OECD's Tax Administration 3.0 framework (OECD, 2021). This five-level scale is proposed here as a conceptual companion to the seven dimensions, not as an empirically validated instrument; its operationalization into a scored diagnostic tool is precisely the empirical extension called for in section 7.

Moreover, the study highlights the significance of digital governance and leadership in the success of transformation programs. Public officials need to ensure a permanent alignment between the administration's strategic goals and the digital initiatives implemented.

Finally, the proposed framework can help guide the modernization strategies of tax administrations in emerging economies and enhance their ability to improve the quality of services offered to taxpayers while consolidating their fiscal performance.

6.3. Public Policy Implications

The study highlights the importance, for governments of emerging economies, of adopting a coherent, long-term vision of tax digital transformation.

This vision should not be pursued in isolation from the wider digital-government agenda. The World Bank's (2024) overview of GovTech and public-sector modernization argues that the highest returns on digital investment arise when tax-specific reforms, such as those examined in this article, are embedded in a whole-of-government digital public infrastructure, shared digital identity systems, interoperable payment rails and common data standards, rather than being developed as a stand-alone tax-administration initiative. For tax authorities in emerging economies, this suggests that governance and strategic alignment (P4) should extend beyond the boundaries of the tax administration itself, to encompass coordination with the national digital-government agenda.

Technological investments need to be complemented by institutional reforms, training arrangements, and governance mechanisms capable of sustaining the modernization of tax administrations over time.

7. Conclusion

Today, digital transformation is a major lever for the modernization of tax administrations and a decisive factor for improving public performance. Faced with faster technological innovation, growing taxpayer demands and the increased complexity of tax environments,

administrations are required to develop digital capabilities that improve their operational efficiency, their audit capacity and the quality of the services they provide to users.

This research proposed a multidimensional conceptual framework of digital maturity for tax administrations adapted to the context of emerging economies, based on an in-depth literature review. The developed model rests on seven interdependent dimensions: technological infrastructure and systems integration, process digitalization and automation, data and analytics capability, governance and strategic alignment, cybersecurity and digital trust, organizational capabilities and human capital, and digital service quality and taxpayer experience.

The analysis reveals that digital maturity is not confined to the adoption of advanced technologies. It stems from tax administrations' capacity to coherently mobilize their technological, human and organizational resources in order to create public value and durably improve their fiscal performance. Morocco's case, documented in section 4 through the DGI's own activity-report data, shows the remarkable progress made in tax digitalization, but also the continuing need to improve systems integration, data use, and organizational capacity.

This research nonetheless has several limitations that go beyond the conceptual, non-empirically-validated nature of the model already noted above.

First, the literature review underlying the framework follows a narrative rather than a systematic or bibliometric protocol; while this choice was deliberate and is justified methodologically in section 1, it also means that the selection of the seven dimensions (section 3) reflects the authors' synthesis of the reviewed literature rather than a fully reproducible, inter-coded selection procedure, a limitation already acknowledged explicitly in relation to the choice of dimensions. Second, the Moroccan illustration mobilized in section 4, although now grounded in the DGI's published activity-report statistics rather than purely narrative claims, remains a single-country illustration and not a systematic empirical test of the seven propositions; the documented indicators (SIMPL adoption, tele-payment and tele-declaration volumes) speak mainly to the technological-infrastructure and process-digitalization dimensions, and comparable public indicators were not available to the authors for the governance, cybersecurity, organizational-capabilities and service-quality dimensions, which therefore remain illustrated only qualitatively. Third, relying on a single country limits the generalizability of the illustration: Morocco's institutional trajectory, marked by early and centrally coordinated digital strategies (Maroc Numeric 2013, Maroc Digital 2020), may not be representative of emerging economies with more decentralized tax administrations or more constrained digital infrastructure; a comparative illustration involving one or two additional emerging economies, for instance drawing on the multi-country evidence assembled by Okunogbe and Santoro (2023) for Sub-Saharan African tax administrations, would have strengthened the generalizable scope of the framework, and constitutes a natural extension of this work. Fourth, the moderating variables identified in section 3.2 (institutional capacity, political stability, fiscal decentralization, digital-infrastructure development) are proposed conceptually but not tested, since testing them requires the comparative empirical design outlined below.

Several research avenues can be envisaged in this respect. Future work should develop a measurement scale of the digital maturity of tax administrations based on the seven dimensions proposed, following established procedures for construct measurement and scale development in management and information-systems research (Churchill, 1979; MacKenzie, Podsakoff, & Podsakoff, 2011). Concretely, this would involve: (i) item generation for each of the seven dimensions based on the sub-dimensions discussed in section 3.3, drawing on expert interviews with tax officials; (ii) an assessment of content validity through a panel of academic and practitioner experts; (iii) a pilot survey among a purposive sample of tax administrations or regional tax offices to refine item wording and response scales; and (iv) a

confirmatory factor analysis, followed by structural-equation modeling of the relationships summarized in Table 2, to test propositions P1 to P7 and the moderating role of the contextual variables proposed in section 3.2. Such a scale could then be empirically validated with the Moroccan General Tax Directorate (DGI) or with other tax administrations in emerging economies. International comparative studies, extending the single-case illustration used here, would also make it possible to analyze differences in digital-transformation trajectories among tax administrations and to identify the institutional factors likely to influence their level of digital maturity.

This research is thus a first step toward the development of an integrated analytical framework for better understanding the relationships among digital transformation, digital maturity and fiscal performance within contemporary public administrations.

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