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The Impact of Risk Management Efficiency on Organizational Performance in State-Owned Enterprises and the Mediating Effect of Supply Chain Maturity: Evidence from Morocco

Benkirane Kawtar [1, *] and Benazzi Khadija [1]

[1] Department of Economics and Social Sciences, Cadi Ayyad University of Marrakesh, Marrakesh 40000, Morocco.

* **Corresponding author:** benkiranekawtar81@gmail.com.

ABSTRACT: While numerous studies have explored the influence of effective risk management on performance, the specific dynamics within state-owned enterprises (SOEs), particularly in developing nations like Morocco, remain less understood. This study investigates the interactions between risk management effectives, supply chain maturity and both the financial and social dimensions of performance within Moroccan public commercial offices (OMPAM). The main objective of this article is to study the impact of formalized risk management practices on the organizational performance of Moroccan public offices with commercial activities. As well as the impact of integrated risk management on the organizational performance of public offices and subsequently show the role of the mediating variable which is the maturity of the supply chain on the relationship between the effectiveness of risk management and the organizational performance of public offices. Data were collected from 140 managerial employees across five Moroccan public commercial offices. Data was analyzed using Partial Least square Method on SPSS and Bootstrapping on SmartPLS, because these two tools are effective and provide reliable results in management science research. We mobilized also the non-probability "snowball" sampling technique to generate much more response due to the difficulties of accessing respondents in this sector. The results reveal that risk management positively influences organizational performance, which is partially confirmed. Concretely, the formalization of risk management practices is supported, while integrated risk management shows a negative effect on the organizational performance of public offices, contradicting our expectations, which reflects on the one hand the weak relationship between the two variables with a negative student T of -6.040. Moreover, we conclude also that the maturity of the supply chain exerts a mediating effect between the efficiency of risk management and the level of performance in Moroccan public offices with commercial activities. These interactions seem to diverge from the initial model when studying each of the financial and the social dimensions each on its own. The study's limitations include potential biases in self-reported data, a limited number of factors considered in the model, and the specific context of Moroccan public sector organizations, which may limit the generalizability of the findings. The study underscores the importance of formalizing risk management practices and developing mature supply chains to improve organizational performance in public sector enterprises. Policymakers and managers should focus on these areas to enhance the resilience and efficiency of SOEs in Morocco. Further research should explore the contextual factors affecting these relationships and develop tailored strategies for different organizational environments.

Keywords: state-owned-enterprises, organizational performance, risk management efficiency, supply chain maturity.

I. INTRODUCTION

In today's dynamic and complex organizational landscape, the critical role of risk management cannot be overstated, particularly in state-owned enterprises (SOEs). These entities, which operate under unique

constraints and expectations, require robust risk management strategies to navigate uncertainties effectively. Effective risk management is not merely about mitigating threats but also about optimizing resource allocation and enhancing organizational resilience and performance [1, 2]. The integration of risk management within the broader strategic framework is crucial for sustaining long-term success. This study focuses on Moroccan public commercial offices (OMPAM), recognizing their critical role in the economic and social stability of Morocco. Acknowledging the significance of these entities, the legislator has undertaken ambitious reforms to improve the governance and management of SOEs. The operationalization of the National Agency for Strategic Management of State Holdings and Performance Monitoring of SOEs (ANGSPE) reflects this commitment. Additionally, new legislative and regulatory frameworks support this reform agenda, underscoring Morocco's investment in a new development model that prioritizes EEP reform. The New Development Model (NMD) presented in 2021 emphasized the need to reform SOEs, highlighting their strategic importance for national competitiveness and their role in driving sectoral and territorial ecosystems. This recognition has reinforced the commitment of public authorities to modernize and enhance the efficiency of SOEs. The NMD advocates several principles to improve service quality provided by SOEs, including increased autonomy and performance management.

The NMD underscores the importance of SOEs autonomy to reduce financial dependence on the state, enabling them to generate their own revenues, invest in projects, and make strategic decisions independently. This autonomy allows SOEs to manage their resources more flexibly and respond swiftly to market challenges without excessive bureaucratic constraints. The goal is to reduce state oversight, allowing SOEs to make independent decisions and adapt their strategies to their specific needs while ensuring accountability for performance and public fund utilization. Performance management is another key principle introduced by the NMD, shifting focus from input-based to results-based management. This approach emphasizes concrete outcomes, with SOEs evaluated based on their actual performance and societal impact. Clear, measurable objectives aligned with their mission and citizen needs are encouraged, along with performance indicators to assess efficiency, efficiency, and relevance of actions undertaken. Despite positive financial performance indicators in recent years, challenges remain. For instance, in 2022, net results for SOEs improved by 34% compared to 2021, but significant deficits persist. These deficits, particularly in offices like the National Office of Electricity and Drinking Water (ONEE) and the National Railways Office (ONCF), highlight ongoing financial imbalances. This underscores the importance of examining organizational performance comprehensively, incorporating both financial and social dimensions.

This paper aims to delve into the impact of an often-overlooked variable in the model of organizational performance for state-owned enterprises (SOEs): risk management efficiency [3]. Indeed, the number of published articles on databases such as SCOPUS that study risk management in the public sector is relatively small. A quick search on ScienceDirect using the formula “"risk management" AND ("SOE" OR "public sector")” in the title and abstract fields yields only 56 articles across all fields and years combined.We shall delve into this relation by giving evidence from the Moroccan public commercial offices, with a specific focus on the mediating role of supply chain maturity in all five of the Moroccan public commercial offices : ONCF (National Railway Office), ONDA (National Airports Office), ONP (National Fisheries Office), ONEE (National Office of Electricity and Drinking Water), and ONHYM (National Office of Hydrocarbons and Mines). This list was extracted following a document analysis of the 12 public establishment category offices and based on the work of [4]. The study investigates how risk management interacts with supply chain processes to enhance organizational agility and performance in the complex and globalized market environment [5].

Understanding the intricate interplay between risk management efficiency, supply chain maturity, and organizational performance offers significant strategic value. For policymakers and SOE managers, this study provides critical insights that can inform the development of more integrated and effective risk management frameworks. The mediating role of supply chain maturity in this relationship is particularly compelling, as it highlights how improvements in supply chain processes can enhance the impact of risk management on overall organizational performance [6]. By exploring this tri-variable relationship, the study not only contributes to academic literature but also provides practical guidelines for enhancing SOE performance in volatile markets. This exploration is crucial for creating resilient organizations that can adapt to disruptions, seize opportunities, and maintain competitive advantage in the face of global challenges [7]. In examining these relationships, the research underscores the necessity of an integrated approach where risk management is not isolated but interconnected with supply chain and overall organizational strategies. This comprehensive view is essential for SOEs aiming to enhance their operational efficiency and strategic alignment in increasingly complex environments.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

1. ORGANIZATIONAL PERFORMANCE: AN OVERVIEW

In literature, there are two groups of authors. The first group considers organizational performance simply as the performance of organizations. Theses often claim to study organizational performance but actually address performance in the broadest sense [8-10]. According to these authors, an organization can be understood in three ways: a group of people coordinating their activities to achieve common goals, a response to collective action problems involving coordination, stabilization, and development, and finally, as organized action or the process that generates groups or organizational structures. This perspective aligns with previous sections of this thesis.

The second group of authors considers organizational performance a distinct field. They argue that organizational performance has different meanings depending on individuals, leading to uncertainties and conceptual difficulties in its measurement [11]. According to [6] organizational performance is "a judgment made by an individual or group about the organization, specifically its activities, products, results, or effects." This framework is based on a robust theoretical foundation derived from an exhaustive review of social science literature, encompassing economic, political, social, and human resource domains. This theoretical base is then tested in the field through surveys. Validated by the order of accountants, this model features "multidimensionality," referring to the aggregation of multiple dimensions and stakeholders interested in promoting the organization. Organizational performance is defined as "the ability to correctly acquire and process human, financial, and physical resources to achieve organizational goals" [12]. Organizational performance includes all expected contributions from staff and involves examining how the organization is structured to minimize associated costs and achieve its objectives efficiently [13]. This concept is particularly relevant today due to increased competition and the focus on organizational transformation and change, attracting attention from researchers in human sciences, especially industrial and organizational psychologists [14]. Organizational performance includes financial and non-financial dimensions [2, 13, 15-17] . Financial metrics are based on balance sheet data, such as profit, growth rate, return on equity, and return on assets. However, these only cover part of organizational performance, with non-financial indicators like customer satisfaction [18], employee satisfaction [19], technology [20], environmental indicators [16, 21] and innovation [22] also playing crucial roles. Thus, organizational performance measures how well an organization achieves set goals through organized activities, efficient time management, and social and societal performance [23].

Several models have been developed to measure and enhance organizational performance, each with unique frameworks and focal points. In our research, we extracted 10 models which we mention briefly:

1) Balanced Scorecard (BSC): Developed by Kaplan and Norton in the 1990s, this model integrates financial and non-financial perspectives to better align strategy with operations, enhancing decision-making processes [24].
2) Public Sector Scorecard (PSS): An adaptation of the BSC for public sectors, focusing on non-financial metrics crucial for public administration (Kaplan and Norton, 2001b) cited by [25].
3) EFQM Excellence Model: Advocated by [26] this model emphasizes continuous improvement and organizational excellence across Europe.
4) Lean, Six Sigma, and Lean Six Sigma (LandSSi): These methodologies combine efficiency and quality improvement processes, highly applicable in manufacturing and service industries [27].
5) McKinsey 7-S Framework: Introduced by Peters and Waterman, this model analyzes organizational efficiency through seven interrelated elements [28].
6) Lynch's Performance Pyramid: Discussed by [29], this model links strategic objectives with operational performance metrics.
7) Malcolm Baldrige National Quality Award (MBNQA): This framework emphasizes innovation and improvement, extending to various sectors including education and healthcare [30].
8) Skandia Navigator: Developed by Edvinsson, focuses on intellectual capital as a crucial dimension of performance [31].
9) Common Assessment Framework (CAF): As described by [32] this model is tailored for public administrations in Europe to promote quality and efficiency.
10) Swedish Institute for Quality (SIQ): This model, promoted by [33], supports continuous quality improvements across organizational processes.

Despite the existence of several organizational performance models, there is a relative lack of models specifically tailored to the public sector. Most models, such as the BSC and the EFQM Excellence Model, were initially developed for the private sector and may require adaptations to meet the unique needs of the public

sector, such as transparency, citizen participation, and social responsibility [3]. This gap highlights the need for models specifically designed for the public sector, from which only the Public Sector Scorecard (PSS) emerges as an effective model for the public sector. However, it is largely criticized by scholars.

Even when the PSS adapts the principles of the Balanced Scorecard to the needs and requirements of the public sector bit not enough [3], by emphasizing stakeholder participation, results focus, and continuous process improvement, the PSS offers a robust framework for evaluating and improving organizational performance in the public sector. What Kaplan and Norton do not emphasize enough is the complexity of implementing the PSS, the level of technical expertise, and the availability required to manage this process [3, 34]. This complexity is even more pronounced when introducing the PSS in a Moroccan company due to cultural reasons related to the lack of involvement from high-level hierarchy and political entities in such exercises, and constraints related to transparency and display; technical reasons due to the lack of available knowledge and skills in management control and strategic thinking; and organizational and functional issues linked to structural rigidity, silo functioning, and lack of coordination and cross-functionality. This has been confirmed by several studies which highlight the model's value but focus on the practical difficulties of implementation in educational and training academies in Morocco and elsewhere [35, 36], major public enterprises in New Zealand [37], and hospitals [38].

Moulin, through a lifetime of research, has conducted a study through which he has listed 6 elements that should be taken into consideration in order to effectively evaluate organizational performance of SOEs. Among these, the integration of risk management into performance models was mentioned as being critical for achieving comprehensive assessments. [39] highlight that risk management processes help in identifying, assessing, and mitigating potential disruptions in achieving organizational goals. Ignoring these aspects can render assessments incomplete and expose organizations to vulnerabilities. This has been further validated by [40, 41] who confirm that identifying and addressing key risks is crucial for effective organizational performance. Risk management is often neglected in the public sector due to various factors, including perceived complacency and a reliance on the regulatory state.

In Morocco, the adoption of advanced performance and risk management models encounters specific hurdles. [42], along with [35], point out challenges such as bureaucratic inertia, a deficiency of professionals skilled in modern management techniques, and cultural resistance to systematic changes. Additionally, the Moroccan public sector's predominant focus on compliance rather than performance optimization limits the practical application of integrated models that encompass risk management.

2. RISK MANAGEMENT EFFICIENCY

The evolution of the concept of risk, from its origins in the Italian term "risicare" meaning 'to dare', has significantly shaped modern risk management practices [43]. Risk management has evolved from its early association with gambling to a fundamental business function, marked by the development of probability theory by Blaise Pascal and Pierre de Fermat and later the formal adoption of risk terms in the insurance industry during the 19th century [44].

Nowadays, risk is primarily viewed by scholars through three lenses: as variance, as downside loss, and as opportunity [43]. Each perspective plays a crucial role in the strategic implementation of risk management:

1) Variance: In finance, risk is often quantified as the volatility of expected outcomes.
2) Downside Loss: This view focuses on potential losses, emphasizing the protective aspect of risk management.
3) Opportunity: Highlights the potential gains from undertaking risk, particularly appealing to entrepreneurs and strategic leaders.

In recent years, there has been a paradigm shift in risk management practices, pivoting from basic implementation to a focus on efficiency. This efficiency is crucial not only for managing risks effectively but also for optimizing the use of organizational resources to bolster capacity in facing various uncertainties. The evolution toward efficient risk management is highlighted by the ISO 31000 : 2009 framework, which emphasizes a systematic, structured, and culturally integrated approach to risk management that aligns with organizational strategies to maximize performance [45].

Efficiency in risk management involves more than the mere handling of potential threats; it requires an optimized strategy that enhances organizational outcomes while minimizing resource expenditure. This concept has been explored by [46], who distinguish between risk and uncertainty, suggesting that true risk management efficiency comes from transforming uncertain outcomes into quantifiable risks that can be managed and mitigated.

Efficient risk management practices ensure that resources are allocated judiciously, focusing on critical risks and aligning risk management strategies with organizational goals helps in minimizing wasteful expenditures. It also ensures that response mechanisms are streamlined, developing protocols that facilitate swift decision-making enhances an organization's ability to manage and respond to risks promptly. Finally, efficient risk management ensures that decision-making is improved by integrating risk management into strategic planning, organizations can make more informed, effective decisions.

Aligning risk management with an organization's strategic objectives is crucial for ensuring that the management of risks directly contributes to achieving business goals. This alignment has been emphasized in studies by [40] and KPMG on 2014 cited by [47], who found a positive correlation between effective risk management practices and organizational performance. They advocate for a risk management process that is not only preventive but also enables organizations to seize opportunities that align with their strategic objectives.

A risk-aware culture is vital for the successful implementation of risk management practices. This cultural aspect is highlighted and explored by many authors [48, 49], who discuss the impact of continuous training on enhancing risk perception and management within organizations. Such a culture promotes an open dialogue about risks and supports the sharing of risk information across all levels of the organization, ensuring that risk management is perceived as a value-adding activity integral to the organization's success.

Risk management in SOEs involves not only safeguarding assets but also ensuring these entities meet their public mandates. The strategic integration of risk management with business objectives is facilitated by frameworks such as Kaplan and Norton's Balanced Scorecard, which integrates risk considerations into performance metrics.

Numerous studies have confirmed the positive correlation between organizational performance and risk management efficiency. Many authors have shown that efficient risk management practices do support strategic decision-making and enhance operational resilience, aligning with previous findings [5, 6, 12], who stress the importance of aligning risk strategies with organizational goals for enhanced value creation.

However, achieving optimal efficiency in risk management requires navigating challenges such as maintaining flexibility and fostering innovation while adequately managing risks. Over-stringency can stifle adaptability and innovation, while insufficient measures can expose organizations to undue risks [43, 51, 52]. The role of organizational culture in risk management cannot be overstated. A risk-aware culture supported by ongoing training and development enhances risk management efficiency [53], promoting a proactive and informed approach to managing uncertainties [54].

The comprehensive review of literature underscores the multifaceted nature of risk management in SOEs, highlighting its evolution, strategic importance, and operational impact. Effective risk management not only mitigates potential threats but also positions SOEs to capitalize on opportunities, enhancing their ability to achieve both economic and public-oriented objectives.

3. SUPPLY CHAIN MATURITY AND ITS MEDIATING ROLE

Before discussing supply chain maturity, it is essential to understand the supply chain and supply chain management (SCM). The supply chain (SC) has been addressed through three main perspectives by Stevens since 1989 and it has prevailed. SC is therefore a complex concept: systemic, networkal, and relational. The systemic perspective, represented by Stevens, views the SC as a dynamic system comprising material, technological, human, and organizational elements that interact to satisfy the final customer. It highlights the material and information flows between suppliers, production facilities, distribution services, and customers. The network perspective presents the SC as a network of actors connected by various types of links, emphasizing collaboration among autonomous or semi-autonomous companies responsible for supply, manufacturing, and distribution activities. The relational perspective, defines the SC as a set of relationships between actors that facilitate the transformation of raw materials into finished products, focusing on the social and objective links between participants working toward common goals.

SCM is defined by ASLOG as the "global management of resources aimed at optimally meeting customer demand, whether expressed or anticipated." It involves a comprehensive approach, integrating resources, methods, tools, and techniques to manage the entire logistics chain effectively. According to the Council of Supply Chain Management Professionals (CSCMP), SCM encompasses the planning and management of all supply chain activities, including procurement, transformation, and logistics management, as well as coordination and collaboration with channel partners. The American association APICS defines SCM as the

design, planning, execution, control, and monitoring of supply chain activities to create net value, enhance global logistics, synchronize supply with demand, and measure performance globally.

Supply chain maturity progresses through various stages, often modeled after frameworks like the Capability Maturity Model (CMM) developed by the Software Engineering Institute [55]. The maturity stages generally include:

1) Initial Stage: At this stage, supply chain processes are ad-hoc and unstructured. There is little to no standardization, and performance is unpredictable.
2) Managed Stage: Basic project management processes are established to track cost, schedule, and functionality. There is some level of discipline and structure in managing supply chain activities.
3) Defined Stage: SCM processes are documented, standardized, and integrated into a cohesive framework. There is a greater emphasis on process improvement and consistency.
4) Quantitatively Managed Stage: The organization uses data and metrics to manage and control SCM processes. Performance is more predictable, and processes are measured and controlled.
5) Optimizing Stage: Continuous process improvement is ingrained in the organizational culture. The supply chain is agile, flexible, and responsive to changes in the business environment.

Higher supply chain maturity levels significantly enhance organizational performance by improving coordination, integration, flexibility, and responsiveness. A mature supply chain enables organizations to manage resources effectively, reduce costs, increase customer satisfaction, and achieve strategic goals. It supports the synchronization of upstream and downstream flows, sustainable practices, and social responsibility. As a result, mature supply chains contribute to competitive advantage and long-term success [56].

Several studies have explored the mediating role of supply chain maturity in enhancing organizational performance through efficient risk management. Study [57] show through there meta-analysis that macroeconomic conditions impact company performance, but a mature supply chain can mitigate these effects by ensuring effective resource and process management. Work [58] emphasize the importance of pre-positioning resources and inventory to meet market demands. A well-managed supply chain plays a mediating role by ensuring strategic inventory positioning. Previous authors [59, 60] demonstrate that operational costs affect profitability, and an efficient supply chain can act as a mediator by optimizing processes to reduce these costs. [61] examine through their research the alignment between companies and suppliers in implementing corporate social responsibility initiatives. A responsible supply chain serves as a mediator by facilitating sustainable and ethical practices. As for [62], their study explores cost control through the Activity-Based Costing (ABC) method. An efficient supply chain acts as a mediator by strategically optimizing costs. Finally, there are other researchers who highlight that supply chain maturity helps bridge the gap between innovation and performance by managing material flows and supplier coordination efficiently [63, 64].

In the public sector, effective supply chain management can significantly improve governance and organizational performance. A mature supply chain enhances transparency, accountability, and informed decision-making by providing real-time, accurate data on operational performance, costs, and risks [65, 66]. This transparency allows stakeholders to understand internal processes better, fostering trust and legitimacy.

Moreover, a mature supply chain facilitates responsibility by enabling traceability of every step from raw materials to finished products. This ensures that public sector organizations can uphold quality, safety, and ethical standards, promoting a culture of responsibility and stakeholder respect. Additionally, a well-managed supply chain supports strategic decision-making by offering precise, timely data, allowing managers to identify inefficiencies, anticipate potential problems, and make strategic decisions to enhance processes and maximize value for the organization and its stakeholders.

In conclusion to this literature review, we can base our research on the fact that the variable "effective risk management" could play a major role in the organizational performance model of SOEs. These often operate in complex environments characterized by unique regulatory, political, and economic challenges. Efficient risk management enables these organizations to identify, assess, and mitigate potential threats that could impede their operations. By proactively managing risks, SOEs can ensure continuity of operations, enhance decision-making processes, and improve resource allocation, thereby positively impacting their overall performance. This hypothesis is grounded in the understanding that effective risk management minimizes disruptions, reduces costs, and supports strategic objectives, leading to enhanced performance outcomes. We consider the affirmation below as our primary hypothesis:

1) H1: Risk management efficiency positively impacts organizational performance in State-Owned Enterprises (SOEs).

2) H1.1: Integrated risk management positively influences the level of organizational performance in Moroccan public market-oriented enterprises (OMPAM).
3) H1.2: The formalization of risk management practices positively influences the level of organizational performance in Moroccan public market-oriented enterprises (OMPAM).

Moreover, we conclude that supply chain maturity reflects the development and optimization of supply chain processes, systems, and capabilities. A mature supply chain enhances the efficiency of risk management by improving transparency, accountability, and responsiveness. This, in turn, leads to better organizational performance. The mediating role of supply chain maturity suggests that while efficient risk management directly contributes to organizational performance, its impact is significantly enhanced when the supply chain is mature. A mature supply chain ensures seamless coordination, efficient resource utilization, and proactive problem-solving, thus strengthening the positive effects of risk management on performance. The hypothesis below posits that supply chain maturity acts as a crucial intermediary that amplifies the benefits of risk management efficiency on organizational performance.

H2, Supply chain maturity mediates the relationship between risk management efficiency and organizational performance in SOEs.

These hypotheses will be tested through empirical research to validate the proposed relationships and understand the dynamics between risk management, supply chain maturity, and organizational performance in the context of SOEs.

III. METHOD

1. PARTICIPANTS AND PROCEDURE

A convenience sampling method was used to recruit 140 employees from all 5 commercial offices in Morocco: ONDA, ONCF, ONEE, ONP and ONHYM. The research area chosen in Moroccan public companies is fertile for research in management sciences, especially in the context of this research problem given that there is a gap in the treatment of this research theme in the Moroccan context. Indeed, participants were selected based on their managerial roles to ensure their understanding of the questionnaire content. The sample included 51.4% middle management, 18.6% top management, and 7.9% senior management, providing a diverse representation of organizational hierarchies. The data collection involved an initial pre-test of the questionnaire, reviewed by a thesis supervisor and two external employees from related public sectors. After collecting 187 responses, 47 were excluded due to incomplete data or non-managerial status, resulting in a final sample size of 140 respondents.

1.1 Data Analysis

Descriptive statistics and correlations among key variables were calculated using SPSS 2.0.0. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted to test the reliability and validity of the measurement scales. SPSS was also used for the generation of the latent variables. The structural equation modeling (SEM) using Partial Least Squares (PLS) was performed to test the proposed primary hypotheses using SPSS and bootstrapping to test the secondary hypothesis, using SmartPLS software. The smart PLS software provides effective solutions to the complex relationships of the variables constituting a research study, which is why we mobilized this tool to generate reliable results for our research study.

Model fit was evaluated using R^2 and adjusted R^2. Here are the steps followed in order to generate empirically valid results

1) Step 1 - Data Factorability: To confirm data suitability for factor analysis, we conducted two tests. First, Bartlett's Test of Sphericity. This criterion Evaluates if the correlation matrix significantly differs from an identity matrix. A high value with a p-value close to zero indicates significant correlations, justifying PCA. Second, the Kaiser-Meyer-Olkin (KMO) Test was administered. This criterion measures sampling adequacy. Values above 0.7 are acceptable for PCA.
2) Step 2 - Principal Component Analysis (PCA): We performed PCA with Varimax rotation to enhance item loadings with factors. Varimax is chosen for better axis interpretation, though oblique rotation is also considered due to possible data correlations.
3) Step 3 - Retaining Factors: Using Kaiser's rule, we retained factors with eigenvalues greater than 1, a reliable criterion in statistical literature for determining the number of factors.

4) Step 4 - Scale Refinement Methods: To finalize the constructs and prepare for regression, items with factor loadings below |0.3| on multiple factors or none reaching this threshold on any factor were eliminated. Were also removed all items without loadings above |0.5| on any principal components.
The table below synthetizes the followed protocol in order to guarantee validity and reliability of the results:

Table 1 - Synthesis of the validity and reliability protocol.

Step of the protocol		Adopted measures
Construct validity	Discriminant	Fornell and Lacker Criterion
	Convergent	AVE > 0,7
Internal validity		PCA and PLS
External validity		PCAet PLS
Reliability		Method of Internal Consistency (Cronbach's Alpha)
The Factorability of Items	Sampling adequacy	KMO > 0,5
	Significance of Inter-Item Correlations	Bartlett's Sphericity <0,05

Source: Synthesis done by the author

1.2 Hypothesis Testing

Hypotheses were tested through regression analysis to quantify the direct and indirect effects of the variables. Bootstrap analysis was employed to obtain statistical significance values for t-tests, determining the validity of the hypotheses. The significant level for hypothesis acceptance was set at 95%, with t-values required to be greater than or equal to 1.96.

2. SCALE CONSTRUCTION

2.1 Scale Development for the Dependent Variable

This study adopts quasi-perceptual measures of performance, using Likert scales from 1 to 5. Participants are invited to assess the level of organizational performance of their organization based on their perceptions.

We chose to measure organizational performance by considering two essential aspects: financial performance and social performance. This approach is based on the recognition that the overall success of an organization cannot be evaluated solely in financial terms but must also consider its impact on society and stakeholders. This perspective stems from the position asserting that organizational performance is intrinsically linked to objectives. While the nature of objectives may vary depending on the context and specifics of each organization, our analysis concluded that the primary objectives of public enterprises with commercial activities are mainly divided between financial and social objectives [3, 67, 68].

We evaluate financial performance by considering the bidimensional aspect of organizational performance. The items selected to measure this dimension were carefully chosen, reflecting key aspects such as sales growth, value creation, return on investment, cash flow management, and debt management. A high Cronbach's alpha (0.926) indicates strong internal consistency of the measures, thus enhancing the reliability of our financial performance evaluation. Respondents indicate their level of agreement with each statement on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Regarding social performance, we adopted a more contextual approach based on practices observed at the National Airports Office, utilizing detailed analysis of complaints, user satisfaction measurements, and progress towards customer orientation, reflecting our emphasis on stakeholder experience and satisfaction.

2.2 Scale Development for the Independent Variables

A. *Risk Management Efficiency*

To construct a model for measuring the efficiency of risk management, this study relies on the work of Zamuda and his co-authors from (2019) [50], who defined five levels of risk management efficiency, and ISO 31000 recommendations for effective risk management. The proposed fourteen items are adaptations of the fifth level for pioneering risk management and ISO 31000 recommendations. These items are divided into four dimensions to stay true to the format provided by ISO 31000: Regular Training on Risk Management Practices, Integration of Risk Management Practices Across All Processes, Clear Risk Management Policy and continuous improvement. The definitive number of dimensions though, won't be definitive until after the analysis of components is administered.

These items provide a comprehensive approach to evaluating different aspects of risk management in Moroccan commercial offices. Together, they enable the measurement of various dimensions of risk management efficiency, offering a deeper and nuanced view of how an organization manages its risks and how this can influence added value. Respondents rate each statement on a Likert scale from 1 (not at all effective) to 5 (very effective).

B. *Supply Chain Maturity*

To evaluate the maturity of the supply chain, it was necessary to carefully select the appropriate items to avoid having an excessive number and to make them adaptable to the reality of Moroccan public establishments with commercial activities (OMPAM). This study's approach is based on the work of [69], who developed a supply chain maturity model in six dimensions. According to them, a supply chain consists of at least three entities to evaluate. Our proposal retains only dimensions with cumulative AVE values above 0.5, representing at least 50% of the variance. However, this approach assumes the designer of measurement scales has conducted a thorough factor analysis. Supply chain maturity is evaluated through seven dimensions: strategic, relational, structural, operational, informational, risk and resilience, and sustainability and social responsibility. Following our criteria, we retained the strategic, structural, and relational dimensions, with an average AVE of 0.583 and Cronbach's alpha coefficients of 0.950, 0.946, and 0.940, respectively. Were thus retained 14 items, adapted and divided into three dimensions. Respondents evaluate each statement on a Likert scale from 1 (not at all performant) to 5 (very performant).

IV. RESULTS

1. SUMMARY OF RESPONSES AND SAMPLE CHARACTERISTICS

A primary step was conducted. This consisted of a descriptive analysis of respondents' profiles:

1) Professional Categories: Middle Management is the most represented category (51.4%), followed by Top Management (18.6%) and Senior Management (7.9%), indicating a strong presence of middle and senior managers in our sample.
2) Office Distribution: ONEE is the most frequently mentioned entity (27.9%), reflecting its significant role in Morocco's water and electricity sector. ONP follows with 21.4%, while ONCF and ONDA represent 14.3% and 11.4%, respectively. The mentions of ONHYM show some variation, suggesting a need to consider how respondents perceive different offices.
3) Age Distribution: The 26-35 age group is the largest (45.7%), followed by the 36-45 age group (37.1%). Respondents under 25 and over 45 represent 5% and 12.1%, respectively, indicating a diverse age range with a concentration in the middle age groups.
4) Gender Distribution: The sample is relatively balanced in terms of gender, with males at 57.9% and females at 42.1%, ensuring diverse perspectives in the analysis.

2. VALIDITY OF SCALES AND VARIABLE OPERATIONALIZATION

The objective of this section is to ensure the quality of our variables. The adopted model consists of two independent variables and one dependent variable, measured by item scales (see tables). The operationalization of these variables is critical for the conceptual model's integrity. We use Principal Component Analysis (PCA) via SPSS to refine these measurement scales.

2.1 Refining Organizational Performance Scale

We measured the organizational performance of Moroccan public enterprises using a nine-item scale across two dimensions (table 2). PCA results showed:

Table 2 - KMO and bartlett test- po.

Kaiser-Meyer-Olkin for measuring sampling adequacy.		.795
Bartlett's test of sphericity	Khi-square approx.	882.740
	Ddl	36
	Signification	<.001

Table 3 - Cronbach's alpha reliability test – po.

Cronbach's Alpha	**Number of elements**
873	9

1) KMO Index: 0.795, indicating good factorability.
2) Bartlett's Test: Significant, confirming adequate correlations.
3) Cronbach's Alpha: 0.873 for nine items, indicating strong internal consistency.

Given that the construct has validated all three tests, the data are therefore factorable. PCA with Varimax rotation has extracted a single factor (latent variable/component) to measure organizational performance explaining 69.334% (appendix 1) of the variance. The number of extracted factors is further confirmed firstly by the table of total explained variances, where only one component has an eigenvalue greater than 1 (Appendix 1), and second, through the matrix of components after rotation in the table below. Here are the loadings of all items composing the extracted latent variable:

Table 4 - The matrix of components post rotation - organizational performance.

Items	**Component**
	1
POF04 - 7-1-4: I am satisfied with our level of cash flow maintenance.	.866
POF02 - 7-1-2: I am satisfied with our level of value creation.	.846
POF05 - 7-1-5: I am satisfied with the debt management in the office.	.832
POF01 - 7-1-1: I am satisfied with the sales growth rate.	.823
POF03 - 7-1-3: I am satisfied with our level of return on investment (ROI).	.775
POS02 - 7-2-2: The office adheres to the customer-oriented approach guidelines.	.886
POS03 - 7-2-3: Our customers are satisfied with the quality of our main services.	.877
POS04 - 7-2-4: Our customers are satisfied with the quality of our ancillary services.	.837
POS01 - 7-2-1: The office conducts regular analysis of complaints.	.781

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Source: Output of the regression test from SPSS

All loadings have values above 0.5. We could also add that the variance tests among the items reveal a significant result, with an F of 21.514 and a significance of 0.000. Tukey's test of additivity also produces an F of 2.92 with a significance of 0.000. It is essential to note that this test examines the hypothesis of non-additivity, which means that the probability indicates the rejection of the non-additivity hypothesis if it is true. In this context, it is possible to reject the null hypothesis that the items are non-additive in favor of the additivity hypothesis.

When discussing the variance test among the items (F-test), a significant result with a very low probability (0.000) suggests that the variance among the items is not merely due to chance but is significant. This indicates that there are substantial differences among the items studied. As for Tukey's test of additivity, it aims to determine if the items studied are additive in their relationship. The fact that the probability is very low (0.000) suggests that the hypothesis that the items are non-additive is unlikely. In other words, there is strong statistical evidence to support the idea that the items are indeed additive in their relationship.

In conclusion, these statistical results reinforce the validity of the measures used and the consistency of the items studied, thereby enhancing the credibility of the conclusions drawn from the study.

2.2 Refining Supply Chain Maturity Scale

Supply chain maturity of Moroccan public offices with commercial activities is measured using a scale of 14 items distributed across 3 dimensions (table 7). Here are the results of the scale purification step.

First of all, the KMO index of the initial construct of the scale is 0.777, which is greater than 0.7. This indicates that the expressed correlations are representative of a positive correlation between the mentioned variables. Similarly, Bartlett's test of sphericity is acceptable.

Table 5 - KMO and bartlett test - supply chain maturity.

Kaiser-Meyer-Olkin for measuring sampling adequacy.		.777
Bartlett's test of sphericity	Khi-square approx.	1797.408
	Ddl	91
	Signification	<.001

Source: Output of the regression test from SPSS

To evaluate the internal consistency of the 14 items, calculated Cronbach's alpha coefficient was calculated, which amounts to 0.939. This value is considered very satisfactory as it exceeds the recommended minimum threshold of 0.60 and is close to 1, indicating good internal consistency among the items. Therefore, we conclude that the data are factorable since the construct passes all three tests.

Table 6- Cronbach's alpha reliability test - supply chain maturity.

Cronbach's Alpha	Number of elements
.939	14

Source: Output of the regression test from SPSS

The PCA with VARIMAX rotation allowed for the extraction of 3 components, accounting for 71.746% of the variance (Appendix 2). The number of extracted factors is further confirmed in the table of total explained variances, where three components have a total value greater than 1.

Table 7 - The matrix of components post rotation - supply chain maturity.

Items	**Component**		
	1	2	3
MChLS01 - 1-1-1 - The company clearly identifies the performance objectives of the supply chain.	.798		.350
MChLS02 - 1-1-2 - The company has clearly defined its flow management strategy.	.488		.348
MChLS03 - 1-1-3 - The company outsources activities that have little or no added value and are not strategic.	.780		.386
MChLS04 - 1-1-4 - The strategic resources and competencies (valuable, rare, inimitable, non-substitutable) as well as common values and principles are clearly defined.	.500	-.728	.036

MChLS05 - 1-1-5 - The company's supply chain strategy is aligned with its overall business strategy.	.790	-.394	
MChLS06 - 1-1-6 - The company aligns the level of environmental uncertainty with the responsiveness of its resources and capabilities.	.764		-.499
MChLS07 - 1-1-7 - The company's supply chain strategy is aligned with its functional strategies.	.757		
MChLRFh01 - 1-2-1 - The company develops joint training programs with its supply chain partners.	.368	.603	
MChLRFh02 - 1-2-2 - Problems are resolved jointly among the different functions of the company.		.661	
MChLRFh03 - 1-2-3 - Activities are planned jointly among the different functions of the company.		.775	
MChLSO01 - 1-3-1 - The company has common work teams (formal or informal) among its different functions.	-.323	.302	.690
MChLSO02 - 1-3-2 - The tasks and missions of one functional entity are understood by other functions within the company.	.419	.119	.636
MChLSO03 - 1-3-3 - The company knows the number of supply chain tiers (horizontal structure) and the number of actors per tier (vertical structure), and can position itself accordingly.	.018	.495	.589
MChLSO04 - 1-3-4 - The processes and procedures of the entire supply chain are well identified and are known and understood by all members of the supply chain.	-.292	.315	.688

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Source: Output of the regression test from SPSS

According to the standard of eliminating items, the item "MChLS04 - 1-1-4 - The common strategic resources and competencies (valuable, rare, inimitable, non-substitutable) as well as common values and principles are clearly defined" should be removed to have a communality greater than 0.5 with more than one factor. However, removing this item reduced the KMO to 0.677, which could be considered insufficient by many authors. Consequently, after several attempts, we found that the best combination was to remove the items MChLS03 and MChLS05 instead, even though the latter showed no anomalies. This combination increased the KMO to 0.803, with a recovery of 75.229% of the variance (Appendix 3). As for Cronbach's alpha, it increased to 0.930.

Table 8 - KMO and bartlett final construct- supply chain maturity.

Kaiser-Meyer-Olkin for measuring sampling adequacy.		.803
Bartlett's test of sphericity	Khi-square approx.	1346.056
	Ddl	66
	Signification	<.001

Source: Output of the regression test from SPSS

Table 9 – Cronbach's alpha of the final construct.

Cronbach's Alpha	Number of elements
.930	12

Source: Output of the regression test from SPSS

2.3 Refining Risk Management Function Efficiency Scale

The efficiency of the risk management function of Moroccan public offices with commercial activities is measured using a scale of 12 items distributed across 2 dimensions (Table 11). Here are the results of the scale purification step. The KMO index is 0.852, indicating that the expressed correlations are representative of a positive correlation between the mentioned variables. Similarly, Bartlett's test of sphericity is good.

Table 10 - KMO and bartlett test of final construct - supply chain maturity.

Kaiser-Meyer-Olkin for measuring sampling adequacy.		.852
Bartlett's test of sphericity	1835.279	1346.056
	91	66
	<.001	<.001

Source: Output of the regression test from SPSS

To evaluate the internal consistency of the 12 items, we calculated Cronbach's alpha coefficient, which amounts to 0.930. This value is considered very satisfactory as it exceeds the recommended minimum threshold of 0.60 and is close to 1, indicating good internal consistency among the items. Therefore, we conclude that the data are factorable since the construct passes all three tests. The PCA with VARIMAX rotation allowed for the extraction of 2 components, accounting for 74.329% of the variance (Appendix 4). The component matrix after rotation (Table 11) establishes that:

Table 11 – Components matrix post rotation – emr.

Items	**Components**	
	1	2
EMRGIR01 - 2-1-1 - The staff is regularly trained on risk management practices.	.744	-.376
EMRGIR02 - 2-1-2 **-** Risk management practices are integrated throughout the entire chain of processes.	.799	
EMRGIR03 - 2-1-3 - The adopted risk management practices take into consideration the specificities of the office's internal and external environment.	.817	-.343
EMRGIR04 - 2-1-4 **-** The design of the risk management function considers the needs and expectations of external stakeholders.	.751	
EMRGIR05 - 2-1-5 - The office conducts regular risk assessments related to its activities.	.602	.667
EMRGIR06 - 2-1-6 - Incentives are in place to promote proactive risk management.	.739	.343
EMRFP01 - 2-2-1 **-** The office has a clear policy regarding risk management.	.387	.821
EMRFP02 - 2-2-2 **-** The office has established emergency plans to address major risks.		.861
EMRFP03 - 2-2-3 **-** Resources are primarily allocated to the risk management function.		.872
EMRFP04 - 2-2-4 **-** The office follows the best risk management practices in the sector.	.699	.558
EMRFP05 - 2-2-5 **-** Mechanisms for monitoring and evaluating risk management actions are in place.		.855
EMRFP06 - 2-2-6 **-** The strategy of the risk management function is aligned with the office's vision, mission, and values.		.833

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
A Convergence of rotation on 3 iterations.
Source: Output of the regression test from SPSS

The number of extracted factors is further confirmed by the table of total explained variances, where two components have a total value greater than 1 (Appendix 4).

We notice that the items "EMRFP04 - 2-3-4 - The office follows the best risk management practices in the sector" and "EMRGIR05 - 2-1-5 - The office regularly assesses the risks related to its activities" show communalities greater than |0.5| on more than one factor. After removing these items, Cronbach's alpha increased to 0.939 (Table 12).

Table 12 – Cronbach's alpha of the final construct – emr.

Cronbach's Alpha	Number of elements
.939	10

Source: Output of the regression test from SPSS

2.4 Synthesis and Discriminant Validity

At the end of this analysis of the measurement scales for the variables in our model, we can establish a summary table that outlines the main identified components. We retain a model with 6 factors as represented in the table below:

Table 13 – Synthesis of measurement scales.

Variable	Items measuring each variable	Number of items	Cronbach's Alpha	Components / Latent variables
Organizational performance	POF01, POF02, POF03, POF04, POF05, POS01, POS02, POS03, POS04.	9	0,873	F1_PO
Supply chain maturity	MChLS01, MChLS02, MChLS04, MChLS06, MChLS07, MChLRFh01, MChLRFh02, MChLRFh03, MChLSO01, MChLSO02, MChLSO03, MChLSO04.	12	0,939	F1_MChL_St F2_MChL_RFh F3_MChL_SO
Risk management efficiency	EMRGIR01, EMRGIR02, EMRGIR03, EMRGIR04, EMRGIR06, EMRFP01, EMRFP02, EMRFP03, EMRFP05, EMRFP06.	10	0,930	F1_EMR_GIR F2_EMR_FPGR

The Fornell-Larcker criterion is one of the most popular techniques used to verify the construct validity of measurement models. According to this criterion, the square root of the average variance extracted (AVE) by a construct should be greater than the correlation between this construct and any other construct for discriminant validity, and the AVEs should all be greater than 0.7 for convergent validity. Once these conditions are met, construct validity is established. The correlation table between the means of the items is presented as follows:

Table 14 - Corrélations bivariée entre les moyennes des variables.

Pearson's Correlation	Av_MChL	Av_EMR	Av_Perf
Av_MChL	0,816		
Av_EMR	.677**	0,880	
Av_Perf	.409**	.725**	0,767
N	140	140	140

**. The correlation is significant at the 0.01 level (two-tailed).

After replacing the "AVE" on the diagonal of the correlation matrix with their square roots, we can conclude that the discriminant validity of the construct is validated.

Table 15 - Discriminant analysis and construct validity.

Le critère de Fornell-Larcker	AV_MChL	AV_EMR	AV_Perf
AV_MChL	0,903		
AV_EMR	.454	0,896	
AV_Perf	.409	.663	0,876

Source: Outputs of multiple correlation tests on SPSS

The preliminary results obtained through PCA will serve as a solid foundation to guide the explanatory phase of our research. Indeed, the factor analysis of certain concepts revealed hidden dimensions, thus contributing to a better understanding of their nature. We therefore retain the following final conceptual model. After verifying the operationalization of the measured concepts using the item scale, we can now proceed to the hypothesis validation tests.

2.5 Test of hypotheses

To estimate the regression model with the dependent variable (F1_PO) and the 5 extracted latent variables (representing the 2 independent variables), here is the estimated regression equation:

$$F1\_PO=\beta0+\beta1\times F1\_MChL\_St+\beta2\times F2\_MChL\_RFH+\beta3\times F3\_MChL\_SO+\beta4\times F1\_EMR\_GIR+\beta5\times F2\_EMR\_FPGR \quad (1)$$

1) $\beta0$ represents the intercept of the equation.
2) $\beta1,\beta2,...,\beta12$ are the regression coefficients associated with each independent dimension.
3) F1,F2 and F3 represent the factors.
4) $F1\_MChL\_St$ represents the strategic dimension of supply chain maturity.
5) $F2\_MChL\_RFH$ represents the relational and human factor dimension of supply chain maturity.
6) $F3\_MChL\_SO$ represents the relational and human factor dimension of supply chain maturity.
7) $F1\_EMR\_GIR$ represents the dimension of the efficiency of risk management.
8) $F2\_EMR\_FPGR$ represents the dimension of the formalization of practices in the efficiency of risk management.

The coefficient of determination R^2 indicates the percentage of variability of the dependent variable explained by the explanatory variables. In our case, the adjusted R^2 is 0.851 for the training sample, which means that the model explains about 85.1% of the variance in organizational performance. The adjusted R^2, which takes into account the number of independent variables in the model, is slightly lower at 83.7%. This percentage is excellent as it exceeds 50%. Furthermore, the F-statistic associated with the model is significant, with a p-value less than 0.001. This indicates that the model as a whole is statistically significant, implying that the independent variables have an overall effect on organizational performance. The linear regression analysis indicates that the model is generally robust, with a Durbin-Watson value of 2.036 confirming no autocorrelation, and an Amemiya ratio of 0.180 suggesting acceptable predictive capacity but room for improvement. The Mallows' Cp criterion of 13 indicates reasonable predictive efficiency, while the BIC value of -203.100 suggests a good balance between model fit and complexity.

Table 16 - Summary of models.

Modèle	R	R-square	R- square adjusted	Standard error of the estimate
1	.922[a]	.851	.837	.40411191

Selection criteria				
Akaike Information Criterion	Amemiya Prediction Criterion	Mallows Prediction Criterion	Schwarz Bayesian Criterion	PRESS	Durbin-Watson
-241.342	.180	13.000	-203.100	27.489	2.083

Source: Results of regression on SPSS

At this stage, we evaluate the postulated relationships between the various concepts. The validation or rejection of hypotheses in this study depends on meeting the conditions established by Chin (1998). To make informed decisions, a Bootstrap analysis was conducted to obtain the necessary values. According to Chin (1998), the confirmation or rejection of a hypothesis depends on the value and statistical significance of the student's t-value. Thus, hypotheses are considered statistically significant at thresholds of $p < 0.01$, $p < 0.05$, and $p < 0.1$ only if their student's t-value is greater than or equal to the absolute value of 2.58, 1.96, and 1.645 respectively. Below the 10% threshold, the significance of the hypotheses is not supported. The retained significance level is 95%, so we retain the hypotheses only if their student's t-value is greater than or equal to the absolute value of 1.96.

Table 17 – Test of regression.

Hypothèse		Relation	Student's T	Status of the hypothesis
H1	H1.1	F1_EMR_GIR -> F1_PO	-6.040	Rejected
	H1.2	F2_EMR_FPGR -> F1_PO	9.503	Validated

Source: Results of regression on SPSS

Overall, the results of our study reveal important findings regarding the impact of effective risk management on the organizational performance of Moroccan public offices with commercial activities. Firstly, hypothesis H1, which asserts that risk management positively influences organizational performance, is partially confirmed. Specifically, the formalization of risk management practices (H1.2) is supported, while integrated risk management (H1.1) shows a negative effect, contradicting our expectations, which reflects on the one hand the weak relationship between the two variables with a negative T student of -6.040

As for the test of the mediating hypothesis, studies in management using PLS to measure this effect rely on the classical analysis by Baron and Kenny (1988). However, using SmartPLS would be a much simpler approach. Here are the results extracted using SmartPLS:

Table 18 - Test of bootstrapping.

Hypothesis	Relation	t	P value	Status of the hypothesis
H2	F1_EMR_GIR-> MChL ->F1_PO	11.623	0.000	Validated
	F2_EMR_FPGR-> MChL ->F1_PO	2.603	0.009	

Source: Results of Bootstrapping on SmartPLS

Based on these results, we conclude that the maturity of the supply chain exerts a mediating effect between the efficiency of risk management and the level of performance in Moroccan public offices with commercial activities.

V. DISCUSSION OF RESULTS

Comparing the results of our study with existing theory helps to better understand the relationship between risk management and organizational performance in Moroccan public offices with commercial activities (OMPAM). Firstly, our results challenge the literature that suggests integrated risk management should have a positive impact on organizational performance. This finding contradicts our expectations and previous research by several scholars [6, 50, 55, 60, 72] who all emphasized the positive correlation between integrated risk management and achieving organizational performance goals. These studies highlight the crucial role of integrated risk management in enhancing business resilience and optimizing operational performance. This discrepancy could be due to several reasons.

In the public sector, integrated risk management can sometimes negatively affect organizational performance. Various authors have examined this issue and highlighted challenges associated with the integration mindset in public organizations. For example, authors have observed that unclear processes can lead to bureaucracy and administrative burden, potentially harming public organizations' performance [32, 45, 72]. Similarly, another author discusses the risks of excessive focus on regulatory compliance at the expense of organizational performance [69]. It was also noted that risk management practices can sometimes be counterproductive and hinder organizational efficiency. Finally, other authors have examined how integrated risk management in the public sector can be influenced by political and media considerations, compromising organizational performance. However, these studies are dated, and their results may be due to the novelty of the integrated risk management concept at the time. Today, this is no longer the case. We must then ask why this variable has a negative impact contrary to expectations.

Secondly, our results also confirm the relevance of formalizing risk management practices to positively influence the organizational performance of OMPAM. This conclusion aligns with the research by many authors [46, 50, 70, 71] which emphasized the importance of establishing clear and structured policies, procedures, and mechanisms for risk management to improve the efficiency and consistency of risk management practices. Through this conclusion, OMPAM remain faithful to their reputation that formalization and bureaucracy generate performance in the public sector [72, 73]. By validating this sub-hypothesis, we conclude that a clear risk management policy, the implementation of emergency plans to deal with major risks, clear resource allocation, strategic alignment of risk management with vision and values, and monitoring of management actions significantly contribute to achieving a better level of organizational performance in the context of OMPAM.

Aligning our results with these conclusions highlights the positive impact of formalizing risk management practices on OMPAM's ability to proactively anticipate, assess, and manage risks, thereby enhancing their overall organizational performance.

In summary, our study confirms the validity of some theoretical perspectives advanced in the literature on risk management and organizational performance and challenges others. By integrating our research results with previous works by researchers, [6, 50, 55] we provide additional insights into the underlying mechanisms of the relationship between risk management and organizational performance in OMPAM. These theoretical insights enhance understanding of the importance of risk management in the specific context of OMPAM, while also opening new avenues for future research in this crucial area of operations management.

In the literature, supply chain maturity plays a mediating role in explaining the influence of risk management on organizational performance. This emphasizes that effective risk management relies on the ability to anticipate, assess, and mitigate potential threats that could hinder operations. A mature supply chain, is better equipped to handle these risks, with sophisticated monitoring and management systems that offer real-time visibility into operations, allowing for early detection of potential problems. Additionally, a mature supply chain can quickly adapt to changing conditions, reducing risks related to disruptions [69]. Strong relationships with logistics partners enhance resilience against risks, while better inventory management helps mitigate risks of shortages or delivery delays. Studies support that strong relationships with logistics partners enhance resilience against risks. Thus, effective risk management reaches its full potential when the supply chain is mature, ensuring better resilience, more reliable operational continuity, and a higher likelihood of achieving business objectives [70].

Similarly, in the context of OMPAM, we validate the secondary hypothesis through the conclusion that supply chain maturity does indeed mediate between the efficiency of risk management and organizational performance level. This indicates that OMPAM can better anticipate, assess, and manage risks, thereby enhancing their overall performance when their supply chains are mature.

Despite these findings, OMPAM might face particular challenges that limit the impact of supply chain maturity on performance. For example, budget constraints [74], strict regulations [75], or fluctuating market

conditions [76] might play a significant role in organizational performance. In some cases, supply chain maturity may not be sufficiently developed to have a significant mediating effect between risk management efficiency and organizational performance. Other factors, such as organizational culture, managerial skills, or specific characteristics of operations in OMPAM, may also have a more direct influence on performance. Additionally, some important variables related to risk management or logistical operations might not have been fully evaluated in this study.

VI. CONCLUSION: LIMITS AND PERSPECTIVES

Our study highlights the positive impact of formalized risk management practices on the organizational performance of Moroccan public offices with commercial activities (OMPAM), aligning with previous research that emphasizes the benefits of structured policies and procedures. However, integrated risk management showed a negative effect on performance, likely due to bureaucratic inefficiencies and overemphasis on compliance within the public sector. Additionally, supply chain maturity did not mediate the relationship between risk management efficiency and performance, possibly due to specific challenges faced by OMPAM, such as budget constraints and regulatory pressures. These findings suggest that context-specific factors significantly influence the efficiency of risk management practices. Future research should further explore these factors to develop more tailored strategies for enhancing public sector resilience and efficiency in Morocco.

As with any research, our study has certain limitations. First, the review of experience has limitations, particularly the risk of omission and subjectivity bias. This highlights the need for a more comprehensive literature analysis in future research. Secondly, the construction of the model was constrained by the number of factors (5 latent variables), preventing a deeper exploration of the various manifest variables. Future research should delve into each dimension and factor more thoroughly to better characterize organizational performance.

This research work is original because it is the first article to focus on risk management and organizational performance in the Moroccan public sector and provides theoretical but also empirical foundations for future research studies in this area.

Future studies could focus on a more detailed analysis of specific variables, exploring the complex interactions between them and examining how they evolve over time. Additionally, longitudinal studies could be conducted to assess the impact of interventions aimed at strengthening risk management mechanisms and practices on the long-term performance of OMPAM.

Finally, a deeper exploration of cultural and contextual aspects, as well as sectoral differences, could provide a better understanding of the variations in the determinants of organizational performance within OMPAM.

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Author Contribution

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Conflict of Interest

The author has no interest in financial or non-financial matters, and the authors do not even have any interests that need to be expressed in this study.

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APPENDIXES

Appendix 1 - The total variance explained – Organizational performance

Component	Initial eigenvalue			Sum of squared loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	% Cumulative	Total	% of variance	% Cumulative	Total	% of variance	% Cumulative
1	1.440	15.998	69.334	1.440	15.998	69.334	1.665	18.498	69.334
2	.890	9.890	79.224						
3	.648	7.199	86.423						
4	.532	6.215	89.982						
5	.469	5.213	91.636						
6	.312	3.470	95.107						
7	.229	2.547	97.654						
8	.122	1.352	99.006						
9	.089	.994	100.000						

Extraction method: Principal component analysis.

Source: Output of the regression test from SPSS

Appendix 2 - The total variance explained – Supply chain Maturity – Initial construct

Components	Initial eigenvalue			Sum of squared loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	% Cumulative		Total	% of variance	% Cumulative		Total
1	7.292	52.086	52.086	7.292	52.086	52.086	4.972	35.512	35.512
2	1.511	10.792	62.878	1.511	10.792	62.878	3.281	23.435	58.947
3	1.241	8.868	71.746	1.241	8.868	71.746	1.792	12.798	71.746
4	.957	6.839	78.585						
5	.676	4.825	83.410						
6	.602	4.302	87.712						
7	.522	3.727	91.439						
8	.435	3.110	94.549						
9	.237	1.694	96.243						
10	.190	1.355	97.598						
11	.139	.992	98.590						
12	.112	.801	99.392						
13	.054	.388	99.780						
14	.031	.220	100.000						

Extraction method: Principal component analysis.

Source: Output of the regression test from SPSS

Appendix 3 - The total variance explained – Supply chain Maturity – Final construct

Components	Initial eigenvalue			Sum of squared loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	% Cumulative		Total	% of variance	% Cumulative		Total
1	5.852	53.199	53.199	5.852	53.199	53.199	4.285	38.957	38.957
2	1.236	11.240	64.439	1.236	11.240	64.439	2.783	25.302	64.259
3	1.187	10.790	75.229	1.187	10.790	75.229	1.207	10.971	75.229
4	.675	6.138	81.368						
5	.621	5.643	87.011						
6	.487	4.429	91.440						
7	.400	3.634	95.075						
8	.221	2.005	97.080						
9	.184	1.675	98.755						
10	.083	.752	99.507						
11	.054	.493	100.000						

Extraction method: Principal component analysis.

Source: Output of the regression test from SPSS

Appendix 4 - The total variance explained – Risk management efficiency – Initial construct

Components	Initial eigenvalue			Sum of squared loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	% Cumulative	Total	% of variance	% Cumulative	Total		
1	8.584	66.027	66.027	8.584	66.027	66.027	5.633	43.332	43.332
2	1.079	8.302	74.329	1.079	8.302	74.329	4.030	30.997	74.329
3	.904	6.955	81.283						
4	.579	4.457	85.740						
5	.498	3.833	89.574						
6	.431	3.316	92.889						
7	.226	1.735	94.624						
8	.189	1.457	96.082						
9	.143	1.100	97.181						
10	.112	.865	98.046						
11	.096	.742	98.788						
12	.085	.651	99.439						
13	.073	.561	100.000						

Méthode d'extraction : Analyse en composantes principales.

Source: Output of the regression test from SPSS