This study examines the contribution of management control to performance piloting in Moroccan companies in a digital context, focusing on how differences in digital maturity reconfigure this contribution.

The problem addressed concerns regarding how the type of digital technologies adopted and its degree of integration explain which conditions they maintain, reinforce, or marginalize the contribution of management control in performance piloting. The study adopted qualitative research based on semi-structured interviews conducted with 23 managers from 10 companies. The findings show that digitalization significantly affects the contribution of management control. In firms using fully integrated ERP (enterprise resource planning) systems, a strong association ($r \geq 0.7$) appears between tool automation, performance measurement, and the declining role of management control. In contrast, partially integrated ERP is correlated ($r \geq 0.65$) with maintaining the traditional role of management control. However, adopting specific or standardized systems are associated with the gradual marginalization or possible suppression of the management control function. This study identifies distinct configurations of management control contributions depending on the nature of the IT adopted and the level of ERP integration. The analysis shows that attitudes toward digital technologies and decision-making effectiveness shape this contribution by influencing the level of effective technology use. The results also indicate that integration automates most management control tasks related to performance piloting, thereby limiting the contribution of the management control function. These results can guide responsible in redefining the objectives and tasks of management control, depending on the level of digitalization they have achieved

Keywords: management control, performance piloting, digitalization, ERP systems, Moroccan companies

UDC 658.012.7:658.5:004.9
DOI: 10.15587/1729-4061.2026.352733

IDENTIFICATION OF THE NATURE OF MANAGEMENT CONTROL'S CONTRIBUTION TO PERFORMANCE PILOTING IN MOROCCAN COMPANIES UNDER DIGITAL TRANSFORMATIONS

Mohamed Alami
Corresponding author
Doctor of Economics and Management Sciences
Department of Economics and Management
Sidi Mohamed Ben Abdellah University of Fes
Dhar El Mahraz, B.P. A42, Fès, Morocco, 30000
E-mail: alami.2511@gmail.com
ORCID: https://orcid.org/0009-0008-4780-0386
Adil Laouane
Doctor of Economics and Management Sciences, Professor
Department of Economics and Management
Hassan II University of Casablanca
Route des Chaux et Ciments Beausite, B.P. 2634,
Casablanca, Morocco, 20254
ORCID: https://orcid.org/0009-0005-5065-2474

Received 21.11.2025
Received in revised form 22.01.2026
Accepted 13.02.2026
Published 27.02.2026

How to Cite: *Alami, M., Laouane, A. (2026). Identification of the nature of management control's contribution to performance piloting in Moroccan companies under digital transformations. Eastern-European Journal of Enterprise Technologies, 1 (13 (139)), 16–23. https://doi.org/10.15587/1729-4061.2026.352733*

1. Introduction

Digital transformation is profoundly changing the way companies are governed and structured, forcing a rapid reconfiguration of their organizational practices. Against this backdrop, Moroccan companies are faced with a twofold challenge: to integrate ever more sophisticated digital tools and to adapt their internal functions, particularly management control, to contribute effectively to performance piloting. The emergence of advanced digital technologies is profoundly transforming the roles and instruments of this key function, making it both more strategically significant yet increasingly ambiguous [1]. Understanding the impact of these transformations helps companies choose their digital tools, determine the necessary competences, and redefine the level of contribution of management control in performance piloting. The ongoing evolution of digital technologies continues to reshape the function of organizations, making this issue a highly fertile field of investigation, and driving to heterogeneous and sometimes contradictory findings regarding the role of management control for performance piloting in digital context.

On an international scale, the subject of management control's contribution in performance piloting remains an object of scientific debate. In Morocco's highly heterogeneous economic tissue, where differences in digital maturity accentuate the disparities between companies, management control is at a critical turning point regarding its contribution in performance piloting. The varied levels of digital integration raise unresolved theoretical questions about how management control is reconfigured. In the face of heightened competition, market instability, and rapid technological change, the challenge is no longer simply to implement digital solutions, but to manage their structural implications in order to reposition management control at the heart of corporate strategy over the long term [2].

The evolution of the digital technology market, as well as the growing digital transformation of organizations, have

profoundly redefined managerial practices throughout performance piloting process. Moroccan companies are increasingly investing in information technologies to improve decision-making, coordination, and operational efficiency, which creates new challenges for modeling performance piloting processes within management control. Understanding how digital technologies interact with organizational practices in Moroccan compagnies is now essential to support firms in aligning their piloting systems with the requirements of the digitalization movements. Insights from research on this topic can provide practical recommendations for company responsible to reconfigure the contribution of management control to performance piloting through the optimization of digital tools usage and improvement organizational responsiveness in a context of technological change.

Therefore, examining the evolving relationship between digital transformation and management control remains a relevant research issue to clarify its theoretical foundations and practical implications.

2. Literature review and problem statement

The paper [3] presents research results on performance piloting under digitalization. It is shown that the performance piloting occupies a crucial place in work centered on the management of organizations, to enable company a competitive advantage in an environment characterized by increased instability and market turbulence. But there were unresolved issues related to the contribution of the management control function to this objective is surrounded by elements of uncertainty, particularly with the rise of digitalization. It is shown that the dashboards, which are the most widely used and which present key performance indicators, are the main instrument of communication between management control and the managers throughout the piloting process. In the work [4], the role of management control its to supporting the achievement of the objectives set by management through planning, execution and monitoring and that controllers increasingly manage information needs and strategic alignment. But there was that role has evolved with the development of digital technologies [5], ask it's its contribution of performance piloting.

The work [6] defines digitalization as a deployment of digital technologies to generate value, reengineer processes, enhance operational efficiency, and foster a data-driven organizational. It is shown that digital technology is fundamentally transforming organizational work practices, automating piloting tools and thus raising concerns about the continued effectiveness and strategic relevance of the management control function in digitally driven contexts [7, 8]. But there were unresolved issues related to the impact of this technology on the role of management control to performance piloting, notably before the emergence of ERP and in companies that have not yet adopted them. The reason for this may be the inability of this digital technology to integrate with companies' business processes, this, consequently, reduces the relevance of the information produced by these technologies. In the work [6], these digital tools enhance the arsenal of tools available to managers by facilitating real-time management, the integration of activities and advanced modelling of operations, and enabling the production of more relevant performance indicators [2]. However, the inability of these technologies to integrate with companies' business processes before the arrival of ERP systems limits their effectiveness. All this suggests that it is advisable to understand the nature of the contribution of management control to performance piloting in companies that continue to use this type of technology.

With the advent of ERP systems, the contribution of management control of performance has become the subject of debate throughout the literature, even going so far as to suggest that this function should be abolished. But there were unresolved issues related to the 'end of management control' thesis [9]. These technologies offer new opportunities for modelling organizational operations, integrating organizational activities and managing the business in real time, not to mention the role of innovative technologies such as business intelligence (BI) and artificial intelligence (AI) [6]. The reason for this may be the adoption the other IT has had little impact on management control due to the inability of these systems to support certain innovations, such as the ABC (activity-based costing) method. A way to overcome these difficulties can be after in the presence of ERP systems [8]. This approach was used in [10] have pointed out that the management controller finds itself relieved after the adoption of ERP systems, allowing it to concentrate on value-creating activities and contributing more to the efficiency of decision-making processes [11]. In this context [12], the ERP systems contribute to improving the reporting process by enabling a higher degree of automation and standardization. All this suggests that it is evident that it is necessary to study the determinants explaining the redefinition of the role of management control in performance management in the ERP presence.

In the works [2, 13] it is shown that performance piloting tools, which generally come from management control, has undergone significant change with the move towards digitalization, both in terms of their design and the way they operate. In this context, [13] consider dashboards to be one of the most useful analysis tools in BI (business intelligence), while [2] emphasize that the efficiency and information synergies created by digitalization lead to the production of relevant measures and indicators dedicated to evaluating, controlling and improving performance piloting processes. But there are unresolved issues remain on how management control repositions in this shift [14]. The reason for this may be the digital technologies alone do not explain the relevance of the instruments and measures used to manage corporate performance. A way to overcome these difficulties can be their complementary use with other organizational factors. This approach was used in [15], principally the cost of implementing new systems [16]. This cost includes those corresponding to the duration of the digital transformation, as well as the time required to achieve a return on IT investments, not forgetting the cost of developing the competences and the behavior of potential users [16]. In view of and what precedes, it becomes necessary to examine the impact of the others organizational factors to the contribution of management control in performance piloting.

To resume, the unresolved problems identified in the above works [3, 5, 6, 9, 14] require the redefinition of the role and contribution of the management control function in performance piloting based on the level of digitalization reached by companies. In a context where digitalization continues to pose a challenge to the company, it's necessary to identify the determinants of each reconfiguration of the management control and the variables that are enabling the improvement of the contribution of management control in the performance piloting process in each configuration.

3. The aim and objectives of the study

The aim of this study is to identify the influence of the adoption of digital technologies on the reconfiguration of the contribution of management control to performance piloting in Moroccan companies. This will provide company responsible with insights to better align management control tasks with the requirements of digital transformation and enhance the effectiveness of their performance piloting processes.

To achieve this aim, aim, the following objectives need to be resolved:

– to identify the variables explaining the relationship between the contribution of management control to performance piloting and digitalization;

– to analyze how the digital technologies, principally the ERP systems, change the role of management control and reconfigure its contribution to performance piloting;

– to examine how the adoption of non-ERP digital systems impact the contribution of management control in performance piloting;

– to analyze how organizational and behavioral factors in addition to digital technologies influence the contribution of management control to performance piloting.

4. Materials and methods

The object of this study is the contribution of management control to performance piloting in Moroccan companies in a digital context.

The main hypothesis of this study is that differences in digital maturity characterizing Moroccan companies influence the nature of the contribution of management control to performance piloting. The study assumes that the adoption of digital technologies involves significant changes in decision-making processes and coordination mechanisms within organizations, thereby affecting the role of management control in performance piloting. For analytical purposes, the study focuses on technological, organizational and behavioral dimensions in companies that have already implemented different types of digital technologies.

This qualitative research adopts a multiple-case study design [17]. This methodology follows five stages:

– development of the interview guide: to collect data, semi-structured interviews were conducted using an interview guide. These questions focused on the characteristics of the digital technologies adopted, the factors influencing the relationship between managers and management control on one hand, and between managers and their teams on the other, the quality of the information obtained, and the determinants of both participants' and their collaborators' behavior toward the use of digital technologies. These questions were developed based on findings from the literature review and includes closing questions, ensuring they provided direct answers to the research problem, encouraged participants to reflect, and preserved the researcher's neutrality. The interview questions were organized from general to more specific topics;

– sample composition: 10 companies were selected to operate across a variety of sectors including industry, commerce, agriculture, and agri-food. The selection process also took into account each company's IT infrastructure and organizational setup, in order to assemble a representative sample of Moroccan businesses, which are known for their diversity in both organizational and digital maturity. The study involved 23 participants, all of whom are managers-including two manager-directors-selected based on specific criteria established by the researcher to ensure the collection of relevant and diverse insights on the research topic. The data collection process was concluded once the predefined criteria began to recur, indicating that data saturation had been reached [17];

– data collection: The interviews were conducted face-to-face, lasting between 2 and 2.5 hours, including 20- to 30-minute breaks. The 23 participants included a mix of men (60.87%) and women (39.13%), aged between 28 and 57 years. All participants, whose characteristics are presented in Table 1, held decision-making authority throughout the performance piloting process;

– data processing and analysis: The collected data were analyzed and processed using NVIVO software, which allows for examining the degree of co-occurrence between variables using Pearson's correlation coefficient "r". The analysis begins with the transcription of recorded interviews, followed by a thorough review of the transcriptions and coding. A thematic content analysis was adopted for coding the collected data, utilizing a mixed approach based on both deductive and inductive reasoning (abductive reasoning) [18];

– data presentation: the information produced can take the form of crossover matrix and graph, which are associated with the coding similarity coefficient 'r', for examining the degree of relationship between variables.

Table 1

Respondent characteristics

Characteristic	Categories	Respondents (23)
Age	Between 28 and 35 years	7
	Between 36 and 45 years	10
	Over 45 years	6
Position in the company	Director	2
	Manager	21
Experience in the company	Less than 5 years	2
	Between 5 and 15 years	4
	Over 15 years	17
Experience with IT	Less than 5 years	0
	Between 5 and 15 years	19
	Over 15 years	4

This methodology will provide an analytical basis for understanding how digital transformation reshapes the contribution of the management control to performance piloting. To operationalize this analytical approach, NVIVO software was used to support the data analysis process. The NVIVO software provided the matrix coding queries in the form of cross-tabulation tables (crossover matrices), which allowed to examine relationships between key variables by cross-tabulating thematic nodes, with frequencies representing the number of coded references. Similarly, NVIVO generated similarity coefficients expressed through the Pearson coefficient (r). These coefficients were used as complementary indicator of co-occurrence between themes rather than as statistical correlations between quantitative variables.

5. Results of the impact of digitalization on the contribution of management control to performance piloting

5. 1. Thematic categorization of variables explaining management control's contribution to performance piloting

The thematic analysis of the data was used to identify the themes explaining the contribution of management control to performance piloting, thus determining the variables explaining the nature of this contribution following the adoption of digital technologies by the companies in our sample. This thematic analysis consists of examining key elements within the studied phenomena through coding, based on the identification of core themes to discover, analyze, and characterize underlying patterns or processes, with the unit of analysis being the unit of meaning [19]. This unit corresponds to either a sentence or a portion of a sentence or a paragraph from the transcriptions of the interviews [20]. The themes identified, initially grouped into subcategories and then into categories, are presented in the following Table 2.

Table 2

Results of thematic content analysis

Excerpt	Sub-categories	Categories	Themes
«...The integration of all business processes of our company into ERP systems, making these systems the main source of information throughout the performance piloting process»	Degree of integration	ERP Systems	Nature of adopted technologies
« ...The alignment between IT strategies and business needs strengthens our reliance on these systems for decision-making»	Alignment of IT strategies		
« ...Our use of systems other than ERP is mainly due to their lower cost compared to ERP systems»	Acquisition cost	Other systems than ERP	
« ...The small size of our company is more suited to the standardized processes of systems other than ERP»	Company size		
« ...The hierarchical structure of our company delays the flow of information within the company, and therefore constitutes a handicap to the effectiveness of our decisions»	Organizational structure	Organizational limitations	Decision-making effectiveness
« ... We find it difficult to apply our managerial competences due to the dominance of family management in our company»	Management style		
« ...We face resistance from the unions representing our collaborators when executing our goals. They use their influence against some of our decisions»	Union influence	Decision execution difficulties	
« ... Top-down directives limit our flexibility in selecting performance indicators and executing certain operational actions»	Top-down policy		
« The acceptance of using IT by our collaborators increases our confidence in the information we use for decision-making, whether from the adopted systems or from management control»	Acceptance	Collaborators behavior	Behavior towards the use of IT
« ...The resistance exhibited by some collaborators towards using IT reduces our reliance on these technologies and the information produced by them, due to non-availability and poor quality of the information»	Resistance		
« ...All collaborators benefited from internal IT training, especially during the adoption of new systems»	Training	IT competence of collaborators	
« ...Most IT users turn to experienced colleagues, particularly the older and more IT-competent ones, for help when facing difficulties in task execution on adopted IT systems»	Feedback from experience		

The results of the thematic analysis allow for structuring the empirical data by moving from units of meaning to subcategories and broader categories. That categorization makes it possible to identify the different configurations of the contribution of management control to performance piloting, based on the three variables, namely the nature of adopted technologies, decision-making effectiveness and behavior towards the use of IT.

5. 2. Determining the impact of the degree of enterprise resource planning integration on the contribution of management control

The analysis reveals that in the companies surveyed that have adopted ERP systems, the contribution of management control varies depending on whether the ERP systems integrate all business and strategic processes or whether this integration is partial. The following cross-tabulation matrix (Table 3) shows the relationship between the level of integration of these processes in ERP systems and the nature of management control's contribution to performance management among 13 participants from the five companies that have adopted ERP systems.

Table 3 reveals that the proportion of limited contribution of management control increasing from 31% under partial integration to 85% under full integration which explains that higher ERP integration is associated with an important reduction in the involvement in performance piloting of management control.

In the first situation, where ERP systems integrate all processes, it has been observed that digitalization seems to reduce the tasks of the management controller by automating performance piloting tools and measures. This relationship is reinforced by a high coding similarity coefficient ($r \geq 0.7$) generated by NVivo, suggesting a strong co-occurrence between the decline of the involvement of management control and digitalization. This raises a debate about the usefulness of the management control function and the need to redefine its role within the company [19]. In the second situation, where the adopted ERP systems do not automate performance piloting tools and instruments, the strong relationship ($r \geq 0.65$) between the use of digital technologies and the continued persistence of the traditional role of management control in performance piloting is evident. In this case, the intervention of management control is necessary to support the management process by providing managers with the required management tools, such as cost calculations, the development and monitoring of budget forecasts, and the preparation of dashboards and reporting. This is revealed influences of the evolving role of management control in performance piloting in the cases studied.

Table 3

Impact of ERP integration level of management control contributions

ERP integration level \ Type of contribution	Limited contribution, *n* (%)	Traditional contribution, *n* (%)	Total, references
ERP with full integration	11 (85%)	2 (15%)	13
ERP with partial integration	4 (31%)	9 (69%)	13

5. 3. Identifying the role of management control when adopting non-ERP digital systems

Regarding companies studied adopting specific software, which is less expensive than ERP systems, the management control function is marginalized, and its role is limited to producing reports and supplying information to upper management. On the other hand, in companies that use standard software, typically smaller in size, no significant association is identified, as shown in the statements of 10 managers from companies that have adopted these two types of software, presented in Table 4 as follows.

Table 4

Impact of adopting software other than ERP on management control contributions

Type of software \ Type of contribution	Limited contribution, *n* (%)	No contribution, *n* (%)	Total, references
Specific software	8 (100%)	0 (0%)	8
Standard software	0 (0%)	2 (100%)	2

Table 4 shows that the contribution of management control is limited when companies adopted specific software (100% of references), and it is absent at companies adopting standard software (100%). This approved that the type of digital tools defined the degree of involvement in performance piloting.

These findings are supported by a weak coding similarity coefficient ($r \leq 0.35$) obtained from the NVivo matrix coding query, observed between the use of these two types of software and the contribution of management control. In both cases, management control tasks are integrated into those of the accounting function, which prepares purely accounting measures for direction on request during specific meetings.

5. 4. Examining the influence of organizational and behavioral factors in management control's contribution in digitalized environments

According to participants' statements, other variables, aside from the nature of the technologies adopted, also influence the contribution of management control to performance piloting. These variables show a moderate coding similarity coefficient ($0.4 \leq r \leq 0.6$) generated by NVIVO with the contribution of management control. These include the decision-making effectiveness of managers and the behavior towards the use of digital technologies. This effectiveness seems to be affected by numerous factors, according to participants' statements, as shown in Fig. 1 below.

The results show that even in the selected companies using ERP systems, decision-making effectiveness is constrained by centralized organizational structures and the prevalence of family-run management in most firms. Additionally, the influence of collaborators' unions and top-down policies, particularly regarding the deployment of strategies by upper management, significantly impacts the execution of managerial decisions. This suggests that while digital tools can support, in the cases studied, performance piloting, the structure of the organization, prevailing leadership models, and the degree of union involvement could play a critical role in how effectively these tools contribute to performance piloting processes at the selected companies.

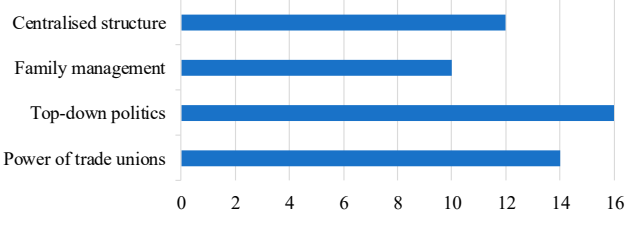

Fig. 1. Factors impacting managers' decision-making effectiveness

Regarding behavior towards the use of IT, it is divided into acceptance and resistance behaviors. According to the statements of the managers, resistance behavior is exhibited by some of their collaborators, often accompanied by limited digital competencies. This behavior, according to the managers interviewed, is associated with a moderate coding similarity coefficient observed in the contribution of management control (Table 5), and generates managerial distrust toward information provided by these collaborators whether sourced from digital systems or through management control processes.

Table 5

Impact of collaborators' behavior on managers' use of digital technologies

Nature of behavior \ Type of recourse	Limited recourse, *n* (%)	High recourse, *n* (%)	Total, references
Acceptance	4 (17%)	19 (83%)	23
Resistance	21(91%)	2 (9%)	23

The results presented in Table 5, highlighting the structuring influence of behavioral factors on digital technology use in performance piloting. with high recourse predominating in contexts of acceptance (83% of references), whereas limited recourse is mainly associated with resistance situations (91%).

In this context, the development of an effective training plan and the implementation of a learning process based on experience feedback are likely to encourage acceptance behaviors towards the use of digital technologies and foster a sense of trust among managers. The managers suggest that by addressing these issues, resistance behaviors may be reduced, ultimately leading to more reliable and confident use of the data generated by digital tools and management control systems. In the framework of the companies studied, this could enhance the contribution of management control in supporting performance management and decision-making.

These findings demonstrate that the contribution of management control to performance piloting in digitalized environments is not determined solely by type or degree

of integration of the digital technologies adopted, but also by organizational and behavioral factors, particularly decision-making structures and users' attitudes toward digital technologies. This suggests that organizational and behavioral factors mediate the relationship between digitalization and management control contribution beyond purely technological explanations.

In the light of these results, which are based on a limited sample of 23 participants, this relationship between digitalization and the contribution of management control of performance piloting seems to apply to the companies studied. To this end, it is recommended that the specific characteristics of the Moroccan context be taken into account when interpreting and generalizing these results with caution, in particular the level of digitization of structures and the management approach adopted.

6. Discussion of the results of the study of the impact of digitalization on the contribution of management control to performance management

The results obtained highlighted the importance of integration degree in identifying the nature of the contribution of management control for companies adopting ERP systems (Table 3), and that the adoption of systems other than ERP, such as specific and standard software, weakens managers' use of these technologies without providing a basis for an effective contribution from management control to performance piloting (Table 4). The mere adoption of ERP systems does not necessarily mean the automation of performance piloting instruments and tools [9]. Some companies that have adopted ERP systems are unable to achieve the degree of total integration that is the key to such automation (Table 3). In other words, the automation of management tools depends not only on the need to adopt ERP systems, but also on companies' ability to integrate all their processes into these systems [9]. Consequently, in this case, management control continues to play its traditional role of preparing dashboards, measuring performance and drawing up and monitoring budget forecasts. Nevertheless, managers sometimes use certain automated measures on the part of the processes integrated into the ERP systems to steer their activities albeit less effectively than in the case of total integration.

For companies adopting systems other than ERP (Table 3), the results show that the contribution of management control is almost non-existent, particularly in the case of companies adopting standard solutions. However, a contribution to management control is observed in certain companies adopting specific software that makes it easier for management control to gather piloting information through connections between digitized modules. This makes it possible to draw up dashboards and communicate certain indicators to senior management as part of global performance piloting.

In addition to the nature of the system implemented and the level of process integration, other factors influencing the nature of management control's contribution to performance piloting emerge from this study (Fig. 1):

– firstly, there is the failure to align IT strategies with business strategies, which limits the use of certain technologies that have been adopted but are not aligned with business needs. These shortcomings have repercussions in the process of gathering information for management control and on the degree of integration in the case of ERP systems. This situation leads to limited automation of piloting instruments and measures and, consequently, maintains the traditional role of management control. In this context, the partial integration of processes in ERP systems, whether due to the misalignment of IT strategies or to the existence of old systems, is complex and a source of potential conflicts between existing systems and new ERP systems, and consequently it affects the automation of performance piloting measures and tools [21];

– the second factor is the nature of the structures and management style of Moroccan companies, which are characterized by centralized structures and the dominance of family management (Table 5). Therefore, the adoption of decentralized organizational structures is a prerequisite for the successful implementation of ERP systems and the automation of performance piloting tools and measures [22]. Thus, the successful implementation of ERP systems requires the adaptation of existing business processes to standard ERP processes and that the interaction of certain organizational components, notably the organizational structure, with the business processes of the technologies adopted must be modified [22]. Likewise, the centralized structures, which are often characterized by top-down policies and a heavy weighting of trade unions, reduce the scope for intervention by management control as well as the decision-making margin available to managers. This margin is necessary throughout the performance piloting process, in terms of choosing indicators and making decisions in real time [14];

– thirdly, the IT competence of users as a determinant of their behavior towards the use of IT, particularly employees (Tables 2, 5). This competence is a crucial determinant of the contribution of management control because it impacts the availability and quality of the information produced by management control. These employees are the primary manipulators of the inputs from the technologies used, and their IT competence is necessary for management control to be able to prepare key performance indicators (KPIs). Similarly, managers also rely on information from the systems used, particularly in the case of fully integrated ERP systems, to make decisions, the effectiveness of which depends on the availability and quality of this information. For this purpose, users' IT competence is a challenge to the successful implementation of IT systems. To achieve this, companies need to improve employees' ability to use information systems (IS) more effectively by adopting learning methods such as in-house training and return of experience [23].

The effective contribution of management control to performance piloting in Moroccan companies, depending on the level of digitalization achieved, requires a set of interrelated organizational and managerial conditions, as follows:

– with regard to the IT structure, the Moroccan company managers, must identify the levels of digitalization in terms of type of digital technology to adopt. This awareness is essential for positioning management control appropriately within the performance piloting processes;

– in terms of organizational structure, Moroccan companies need to modernize their structures through the adoption of more decentralized and managerial forms of organization. Such structures are necessary to support the effective implementation of high-performance information systems, particularly ERP systems, and to enhance the role of management control in performance piloting;

– concerning IT strategy governance, managers must be actively involved in the deployment of IT strategies in order to ensure alignment between the systems adopted and the oper-

ational and strategic needs of the business. This involvement is crucial for integrating management control coherently throughout the performance piloting process and for maximizing the value derived from digital investments.

Despite the efforts made to conduct the survey in the field, this study has several limitations, particularly with regard to the constitution of the sample and the conduct of the semi-structured interviews. The constitution of the sample encountered difficulties in accessing certain companies and in meeting certain managers who apologized for constraints on their availability. Also, these interviews revealed certain biases which are mainly linked to the declarations of managers regarding their behavior towards the use of digital technologies, due to the fact that they limit the problem of behavior to their subordinates. Addressing these limitations is essential for a prudent reading of these results.

Notwithstanding these limitations, the results also open several avenues for future research. One important direction would be to examine how governance structures and informal decision-making processes affect the role of management control in performance piloting within family-owned companies in a digital context. Another relevant avenue concerns longitudinal studies, which would be particularly useful for examining how the contribution of management control evolves over time as companies progress in their digital maturity and achieve higher levels of system integration. These developments are particularly important because the Moroccan context is characterized by the predominance of family-owned firms and differences in the evolution of their digital structures, which are shaped by specific governance practices that may influence digital transformation processes and the evolution of role of management control differently from what has been observed in other contexts.

7. Conclusion

1. The results of the thematic analysis show that the contribution of management control to performance piloting in the digital age depends, in addition of the nature of adopted digital technologies, to the decision-making effectiveness and to the behavior towards IT use.

2. The contribution of management control to performance piloting is strongly conditioned by the type and their level of integration of digital technologies adopted. The companies that have opted for ERP systems capable of integrating all business processes are better positioned to rationalize their digital investments and restructure their performance piloting systems ($r \geq 0.7$). However, the empirical findings indicate that most Moroccan companies remain weakly engaged in the digitalization process, either by adopting systems other than ERP or by implementing ERP solutions that only partially integrate business processes ($r \leq 0.35$). This situation limits the expected contribution of management control and leads to differentiated configurations of its role in performance piloting, ranging from a redefined contribution to the persistence of traditional practices.

3. The nature of structures adopted influence the role of management control function in performance piloting. The results indicate that rigid structures characterized the centralized decision-making, and top-down management practices constrain the development of performance piloting capabilities and hinder the evolution of management control's role ($0.4 \leq r \leq 0.6$). The results show that is where there is necessary to involvement of managers in IT strategy deployment becomes a condition for aligning digital systems with business needs and positioning management control effectively throughout the performance piloting process.

4. The user behavior and IT competence constitute decisive determinants in the success of the performance piloting. The performance use of digital technologies depends largely on users' acceptance behavior and of the level of IT competence of users. These findings underline the need for Moroccan companies to strengthen IT competence through training initiatives and to foster a digital culture that supports the transformation of management control practices.

Conflict of interest

The authors declare that they have no conflicts of interest in relation to the current study, including financial, personal, authorship, or any other, that could affect the study, as well as the results reported in this paper.

Financing

The study was conducted without financial support.

Data availability

Data will be made available on reasonable request.

Use of artificial intelligence

An AI-based language model (ChatGPT, OpenAI GPT-5, 2025 version) was used solely for translation and language polishing. The authors manually checked and edited the material and confirm that the AI tools were only auxiliary. Artificial intelligence was not used to create, process, or interpret scientific data, form conclusions or other elements of the scientific results in the paper.

Authors' contributions

Mohamed Alami: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing; **Adil Laouane:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

References

1. Youssef, M. A. E.-A., Mahama, H. (2021). Does business intelligence mediate the relationship between ERP and management accounting practices? Journal of Accounting & Organizational Change, 17 (5), 686–703. https://doi.org/10.1108/jaoc-02-2020-0026

2. Truant, E., Broccardo, L., Dana, L.-P. (2021). Digitalisation boosts company performance: an overview of Italian listed companies. Technological Forecasting and Social Change, 173, 121173. https://doi.org/10.1016/j.techfore.2021.121173
3. Barney, J., Hesterly, W. (2019). Strategic management and competitive advantage: Concepts and cases. Pearson.
4. Guenther, T. W. (2013). Conceptualisations of 'controlling' in German-speaking countries: analysis and comparison with Anglo-American management control frameworks. Journal of Management Control, 23 (4), 269–290. https://doi.org/10.1007/s00187-012-0166-7
5. Granlund, M., Mouritsen, J. (2003). Special section on management control and new information technologies. European Accounting Review, 12 (1), 77–83. https://doi.org/10.1080/0963818031000087925
6. Schallmo, D. R. A., Williams, C. A. (2018). Digital Transformation Now! In SpringerBriefs in Business. Springer International Publishing. https://doi.org/10.1007/978-3-319-72844-5
7. Fähndrich, J. (2022). A literature review on the impact of digitalisation on management control. Journal of Management Control, 34 (1), 9–65. https://doi.org/10.1007/s00187-022-00349-4
8. Syed, B. A. (2023). The Impact of Digitalization on Management Control Systems: A Framework for the Future, 1 (01), 33–40. Available at: https://assajournal.com/index.php/36/article/view/19
9. Dechow, N., Mouritsen, J. (2005). Enterprise resource planning systems, management control and the quest for integration. Accounting, Organizations and Society, 30 (7-8), 691–733. https://doi.org/10.1016/j.aos.2004.11.004
10. Oesterreich, T. D., Teuteberg, F. (2019). The role of business analytics in the controllers and management accountants' competence profiles. Journal of Accounting & Organizational Change, 15 (2), 330–356. https://doi.org/10.1108/jaoc-10-2018-0097
11. Bergmann, M., Brück, C., Knauer, T., Schwering, A. (2020). Digitization of the budgeting process: determinants of the use of business analytics and its effect on satisfaction with the budgeting process. Journal of Management Control, 31 (1-2), 25–54. https://doi.org/10.1007/s00187-019-00291-y
12. Rowbottom, N., Locke, J., Troshani, I. (2021). When the tail wags the dog? Digitalisation and corporate reporting. Accounting, Organizations and Society, 92, 101226. https://doi.org/10.1016/j.aos.2021.101226
13. Negash, S., Gray, P. (2008). Business Intelligence. Handbook on Decision Support Systems 2, 175–193. https://doi.org/10.1007/978-3-540-48716-6_9
14. Monteiller, G. (2001). Méthodes et pratiques de la performance. le pilotage par les processus et les compétences. Pilippe LORINO. Revue Française de Gestion Industrielle, 20 (2), 129–132. https://doi.org/10.53102/2001.20.02.349
15. Powell, T. C., Dent-Micallef, A. (1997). Information technology as competitive advantage: the role of human, business, and technology resources. Strategic Management Journal, 18 (5), 375–405. https://doi.org/10.1002/(sici)1097-0266(199705)18:5<375::aid-smj876>3.3.co;2-z
16. Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J., Dubey, R., Childe, S. J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities. Journal of Business Research, 70, 356–365. https://doi.org/10.1016/j.jbusres.2016.08.009
17. Yin, R. K. (2003). Designing case studies. Qualitative research methods, 5 (14), 359–386.
18. Shani, A. B. (Rami), Coghlan, D., Alexander, B. N. (2019). Rediscovering Abductive Reasoning in Organization Development and Change Research. The Journal of Applied Behavioral Science, 56 (1), 60–72. https://doi.org/10.1177/0021886319893016
19. Meyssonnier, F., Pourtier, F. (2006). Les ERP changent-ils le contrôle de gestion ? Comptabilité Contrôle Audit, Tome 12 (1), 45–64. https://doi.org/10.3917/cca.121.0045
20. Locke, K., Feldman, M., Golden-Biddle, K. (2020). Coding Practices and Iterativity: Beyond Templates for Analyzing Qualitative Data. Organizational Research Methods, 25 (2), 262–284. https://doi.org/10.1177/1094428120948600
21. Hammouch, H. (2024). Enhancing Management Control Through ERP Systems: A Comprehensive Literature Review. IRASD Journal of Management, 6 (3), 125–133. https://doi.org/10.52131/jom.2024.0603.0128
22. Hong, K.-K., Kim, Y.-G. (2002). The critical success factors for ERP implementation: an organizational fit perspective. Information & Management, 40 (1), 25–40. https://doi.org/10.1016/s0378-7206(01)00134-3
23. Eschenbrenner, B., Nah, F. F.-H. (2014). Information Systems User Competency: A Conceptual Foundation. Communications of the Association for Information Systems, 34. https://doi.org/10.17705/1cais.03480