

Modern Management Control and Internal Governance of Moroccan Public Establishments: An Analysis Using the Structural Equation Method

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Abstract: This study aims to explore, on one hand, the structural and behavioral factors that influence the adoption of new management control tools within Moroccan public establishments, and on the other hand, to assess the impact of this differentiated adoption on the improvement of internal governance of these entities. To achieve this objective, 81 questionnaires have been collected from various public establishments in Morocco, and the collected data were analyzed using the advanced statistical software SMART-PLS4.

The study's results highlight those variables such as the age of the establishment, its technology, as well as the profile and leadership style of its leaders play a significant role in using tools like the balanced scorecard (BSC) and activity-based costing (ABC). In contrast, the size of the establishment, its sector, and the nature of its activities seem to have no notable impact on this adaptation process.

Furthermore, the study proposes a comparative analysis with Simons' control model, revealing that the transition from a diagnostic use to an interactive use of management control systems fosters a governance evolution. This evolution is characterized by a shift from a disciplinary governance, focused on control and collaboration, to a cognitive governance, centered on collaboration and learning. This discovery offers new perspectives on how management control can contribute to the evolution of governance practices in the public sector.

Keywords: Activity-Based Costing, Balanced Scorecard, Collaboration, Control, Contingency Factors, Control Levers.

JEL Classification Codes: H83, M41, D21.

INTRODUCTION

Traditionally, research on organizational governance and management control has been addressed separately, with a particular focus on the interrelationship between management control and governance from a disciplinary perspective. However, in the public sector, studies have primarily concentrated on the evolution of public management. These changes have prompted public establishments to implement management control systems primarily focused on creating quantitative indicators for supervisory bodies. Although this approach was initially oriented towards disciplinary governance, it often reduced managers to purely external interactions, thus neglecting the essential aspect of internal governance necessary for the effectiveness of supervisory directives.

However, a transition towards enhanced autonomy has allowed the emergence of innovative governance methods

that go beyond mere accountability to embrace strategies of collaboration and learning. These innovative approaches to governance combine sustained responsibility of leaders with a participatory methodology, thereby encouraging active listening and consultation for more inclusive management.

In this context, management control in a public establishment that wishes to integrate the cognitive and behavioral aspects of its actors requires more than surveillance and accountability. Traditional control systems, even if effective, are no longer sufficient to achieve this improvement.

This study argues that Activity Based Costing and the Balanced Scorecard, developed in the 1980s by Kaplan and Johnson to highlight the limitations of traditional management control tools, are better suited to the specific characteristics of public establishments and more adequately meet the needs of new governance.

Initially, these tools were perceived by their creators as primarily disciplinary. However, their value lies in their ability to apply a cybernetic model, comparable to a “thermostat,” in managerial contexts often unsuitable for strict cybernetic control. These contexts are characterized by ambig-

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uous objectives, the absence of complete predictive models, difficulty in assessing the impact of corrective actions, and challenges related to performance evaluation and responsibility attribution. In these cases, the diagnostic lever proves to be an essential tool.

Subsequent studies have revealed that the use of BSC (Balanced Scorecard) and ABC (Activity-Based Costing) can be much more effective. Indeed, these tools serve as supports for dialogue, facilitating double-loop learning and encouraging a diversity of perspectives and viewpoints. Here, the interactive aspect of the tools becomes evident.

Nevertheless, it is essential to recognize that these devices are not universal solutions. Their effectiveness is strongly conditioned by the way they are implemented, which underscores the importance of contingency theory in management control. According to this theory, the effectiveness of control systems depends on the specific contextual variables of each organization. Simons' Levers of Control model (1995) fits into this perspective, offering an analytical framework to assess the adaptable role of these tools in the internal governance of organizations. It suggests that it is through their mode of use, whether diagnostic or interactive, that these devices can potentially contribute to improving governance in public establishments.

Therefore, this study aims to analyze how, by considering their implementation as well as structural and behavioral dynamics, the balanced scorecard and activity-based costing can significantly improve internal governance within Moroccan public establishments. It seeks to deepen the reflection on the potential impact of effective use of these tools, considering their capacity to transform governance in the public sector. This transformation is not limited to promoting accountability; it also encompasses the integration of elements of collaboration and learning, crucial elements for effective and innovative governance in the public context.

To address our problem, our study will unfold in three main sections. The first section is dedicated to analyzing the existing literature on the impact of contingency factors on management control practices, as well as on the relationship between management control and organizational governance. The second section presents the methodology adopted for our empirical survey. Finally, the third section examines and interprets the main results of this survey, focusing on how modern tools of management control can contribute to the improvement of internal governance in Moroccan public establishments.

LITERATURE REVIEW

Contingency theory rejects the idea of a universal solution for all organizations, favoring a tailored approach that takes into account the unique context of each organization (Alazard & Sépari, 2007). It acknowledges the existence of specific factors influencing strategic choices and necessitating an adaptation of management control (Al Yami et al., 2021; Ibrahimi & Naym, 2017, 2019; Renaud & Berland, 2020; Ruel, 2019). Bouquin (2008b) suggests replacing the notion of contingency with that of conditionality and relativity in management control. The contingent approach is noted for its flexibility and ability to adapt to various types of or-

ganizations (Alazard & Sépari, 2007; Nartey et al., 2020). It is divided into two perspectives: structural theory, which establishes a correlation between organizational structure and operational situations, and behavioral theory, which focuses on the role and influence of leaders.

In this regard, Simons' Levers of Control model, with its two levers - diagnostic and interactive - becomes particularly relevant to distinguish the roles assigned to management control tools in improving organizational governance. The diagnostic lever allows for regular monitoring and control of performances, while the interactive lever encourages active involvement and continuous dialogue, thus facilitating a more dynamic and adaptive organizational governance. These two levers illustrate how the application of contingency theory to management control can not only meet the specific requirements of each organization but also significantly improve organizational governance.

STRUCTURAL CONTINGENCY FACTORS AND USE OF MANAGEMENT CONTROL TOOLS

Numerous contingency factors influence management control. For the purposes of our study, we will primarily focus on four specific aspects: the size of the organization, its age, the technology it uses, as well as its sector and nature of activity.

H1: Structural factors influence the use of management control tools in Moroccan public establishments

Age

Greiner (1998) proposes a structured methodology for analyzing the impact of an organization's age on management control, focusing on the distinct stages of its development and their repercussion on the adoption of control tools. Mintzberg (1982) and Dupuy (1999) recognize the crucial importance of a company's age and history in shaping its structure and managerial practices. However, research such as that conducted by Affes & Chabchoub (2007), Ngongang (2013), and Ngongang & Njojo (2018) reveals a minimal or nonexistent correlation between the age of the company and the use of accounting data or management control devices. Nevertheless, other studies, such as those by Moores & Yuen, drawing on the life cycle model of Miller and Friesen (1983, 1984), as well as Ngongang & Njojo (2018) based on the work of Simons (1994), observe an increased formalization and sophistication of management control practices as companies mature. O'Connor et al. (2004) and Davila (2005) report that organizations with a long history tend to adopt more elaborate management tools, corroborating the idea that age fosters organizational learning and the creation of more complex management control systems to codify this experience.

H1.1: The older establishment becomes, the more likely it is that the newly implemented management control tools will be used interactively.

Size

The size of the organization proves to be a crucial factor significantly influencing the development and effectiveness

of management control, directly impacting the setting and prioritization of growth objectives (Meyssonier, 2019). Bajjan-Banaszak (1993) highlights that an increase in size leads to a diversification and complexification of management tools. In parallel, Nobre (2001) observes a more thorough formalization of management control tools in expanding French SMEs. Similarly, Germain & Gates (2010) note a positive correlation between the size of the company and the evolution of performance indicators, a trend confirmed in the public sector where larger entities favor non-financial indicators more (Van Haepere, 2012, 2012). Doreen (2005) also notes an increasing sophistication of dashboards in the ministries of the Flemish community as their size grows. In summary, compared to medium-sized enterprises, large organizations tend to adopt a wider range of non-financial indicators, demonstrating the marked influence of size on the composition of performance measurement systems (Fryer et al., 2009; Van Haepere, 2012). A focused analysis on the determinants of the adoption and diversification of management control systems in Moroccan public establishments reveals that size plays a predominant role. A survey conducted by Ahsina et al. (2014) of 41 public establishments shows that the larger an establishment is, the more elaborate its management control system is, thus highlighting the impact of contextual factors on the diversification of management systems. However, a study by Ibrahim & Naym (2017, 2019) on Moroccan public enterprises suggests that size does not necessarily influence the diversity of dashboards and the use of non-financial indicators, indicating that the effect of size may vary depending on the context and institutional specificities.

H1.2: The larger size of the establishment, the more likely it is that the newly implemented management control tools will be used in a diagnostic manner.

Industry and Nature of Activity

In the field of management, the impact of the industry and nature of the activity on the adoption and effectiveness of management control tools is critical. Ngongang (2013) highlighted, through his study on Cameroonian companies, a statistically significant correlation between the industry sector and the use of management control, emphasizing a predominance in the field of analytical accounting. This relationship underscores the importance of contextualizing management tools according to the sector for optimal effectiveness. In parallel, Jellouli (2011) focused on the Moroccan public sector, examining variations in the objectives of the management control system according to the type of public establishment. His research reveals marked differences, particularly a lesser emphasis on objective setting and coordination with management in social sectors, as opposed to commercial public establishments. This study demonstrates that the industry sector, coupled with the mission of management control, shapes distinctive practices. In the same vein, Ahsina et al. (2014) observed that establishments with monopolistic activities and non-commercial orientation adopt more traditional management control systems. This observation highlights the importance of the nature of the activity in the choice and implementation of management control tools. Together, these research findings illuminate the need for a

nuanced and sectoral approach to management control for adapted and effective governance.

H1.3: The sector of the establishment's activity influence the use of modern management control tools.

H1.4: The nature of the establishment's activity influence the use of modern management control tools.

Technology

Technology plays a pivotal role in transforming management control, particularly through advancements such as computer networking, engineering, and microcomputing. These new information and communication technologies (NICTs) allow for the decentralization of control, freeing controllers from some repetitive tasks in favor of more strategic and interactive activities (Boitier, 2002). The integration of these technological tools within the General Councils in France has notably improved the efficiency and flexibility of management control, an observation corroborated by Maurel (2002). Furthermore, the adoption of Enterprise Resource Planning (ERP) systems in multinationals has led to a significant transformation in the role of management controllers, evolving their functions towards more pronounced managerial support (Meyssonier & Pourtier, 2006; Scapens & Jazayeri, 2003). Gullkvist (2013) highlighted the marked influence of ERPs on the evolution of management accounting in Finnish companies. Mawadia et al. (2016) identified the emergence of a hybrid management controller, capable of balancing technical and strategic responsibilities. Finally, the International Observatory of Management Control (2016) recognizes the positive impact of digital transformation and Big Data on this function, marking an era of renewal and increased adaptability for the sector.

H1.5: Technological complexity has a favorable influence on the interactive use of new management control tools.

BEHAVIORAL CONTINGENCY FACTORS AND USE OF MANAGEMENT CONTROL TOOLS

The impact of behavioral factors on management control systems is a crucial area of managerial research. In addition to the objective approach of contingency, a subjective perspective is necessary to understand the role of the leader's profile in the use of management control systems. Indeed, the personal characteristics, expectations, and vision of the leader are key factors that can significantly influence management control practices (Rastogi et al., 2019; Shah et al., 2022; Shao, 2019). This study's approach is to consider the leader not only as a strategic decision-maker but also as an individual with distinct psychological, behavioral, and sociological traits, based on the enlightening work of Bayad & Nebenhaus (1993).

H2: Behavioral factors influence the use of management control tools in Moroccan public establishments.

Director's Management Style

Literature on management control underscores the notable impact of the director's management style on the effectiveness of control systems within organizations. Otley and

Pierre (1995) observed that rigid and authoritarian leadership, coupled with an excessive reliance on budgets, can lead to counterproductive behaviors among executives. Conversely, Germain & Gates (2010) highlighted that managers adopting a hierarchical and integrative decision-making style tend to favor the use of dashboards. Additionally, Yukl et al. (2002) classified leadership styles into three main categories: task-oriented, relationship-oriented, and change-oriented, providing a framework for understanding various managerial approaches. Komarev (2007), as well as subsequent studies by Rastogi et al. (2019), Shah et al. (2022), and Shao (2019), reinforced these notions by demonstrating that a change-oriented management style is particularly conducive to the adoption of innovative management tools. These research findings converge to emphasize that the director's management style is not a trivial factor but a key element that significantly influences the adoption and effectiveness of management control practices in organizations.

H 2.1: A progressive leadership style (relationship-oriented or change-oriented) positively influences the use of modern management control tools.

The Leader's Profile

The leader's profile, encompassing crucial elements such as academic background and professional experience, is a determining factor in the adoption and efficiency of management control systems within organizations. Relevant studies such as those by Bernard (2010) and Bayad & Nebenhaus (1993) have highlighted the significant influence of mental characteristics, as well as psychological and behavioral factors of leaders on management. Initial training, particularly in the field of management, proves to be an influential factor according to the works of Bernard (2010) and Azar (2006), with a greater propensity for management-trained leaders to embrace advanced accounting systems, as demonstrated by Chapellier (1997) and Chapellier et al. (2013). Moreover, professional experience is also a key predictor of the adoption of more sophisticated control systems, as highlighted by Martel et al. (1985) and Nelson (1987). However, this correlation may be nuanced and evolutionary, a reality underscored by the works of Nadeau et al. (1988) and Hamadi et al. (2011). In summary, the combination of academic training and professional experience significantly shapes how leaders perceive and implement management control systems, indicating a complex and multidimensional dynamic that merits in-depth exploration.

H2.2: The leader's profile of the establishment influences the use of modern management control tools.

INTERNAL GOVERNANCE OF ORGANIZATIONS THROUGH MODERN MANAGEMENT CONTROL TOOLS

The internal governance of organizations, supported by modern management control tools, has undergone significant transformation since its initial conceptualizations. The Sloan Brown model (1920) laid the foundation for a management control approach focused on supporting disciplinary strategies with an ex-post perspective, centered on compliance with objectives. This vision was supported and developed by researchers such as A. Hopwood (1980s) and Bouquin

(2004, 2008b). Bouquin particularly highlighted the distinction between responsibility centers and mere execution control, illuminating their pivotal role in contractual governance (Rouby & Solle, 2002). However, faced with the challenges of ambiguity and uncertainty, this contractual approach gradually gave way to a more collaborative and flexible governance perspective (Quemener, 2011). Charreaux (2011) furthered this reflection by examining how various steering levers — disciplinary, cognitive, and behavioral — shape internal governance. Building on the model of Simons (1994), he emphasized the crucial importance of interactive levers for effective and adaptive governance. These developments reflect a growing awareness of the need for dynamic and responsive internal governance, capable of aligning with contemporary strategies and challenges faced by organizations.

H3: The differentiation in the use of modern management control tools influences their contributions to improving the internal governance of public establishments.

Disciplinary Governance through Modern Management Control Tools: A Diagnostic Use

A Hopwood, as early as the 1980s, revealed how management control practices enable effective delegation of operational management while maintaining strict control of outcomes, thus establishing a fundamental link with governance issues. Bouquin (2004) reinforced this perspective by describing management control as a “key component” of organizational governance. He further specified in 2008 that management control, based on distinct responsibility centers rather than mere execution control, operates through a series of normative mechanisms designed to ensure that actions conform to predefined objectives (Rouby & Solle, 2002). Sargiacomo (2008) deepened this analysis by demonstrating that management control acts as a technology of government with a disciplinary aim, particularly in contexts where the management demands specific outcomes without mastering operational processes. This approach aligns with principal-agent theory, favoring financial indicators and the reliability of accounting data, forming a basis for disciplinary governance structured around a “plan/budget/reporting” logic (Pesqueux, 2002). Simons (1994) described this type of control as diagnostic, used to monitor outcomes and correct deviations from predefined performance standards. The Balanced Scorecard (BSC), highlighted by Kaplan et al. (1996); Kaplan & Norton (2001a, 2001b); and others (Anuforo et al., 2019; Fahmi F. Al-Hosaini et al., 2023) is a key tool in this disciplinary governance, facilitating the communication of strategies and the evaluation of responsibility centers. It allows for simultaneous visualization of performance across different units and integrates non-financial indicators to manage organizational complexity (Rahayu et al., 2022). The BSC also promotes double-loop learning, safeguarding long-term objectives while facilitating strategy adjustments (Kaplan & Norton, 2001b; Naro & Travaillé, 2011). Activity-Based Costing (ABC) is another crucial instrument for disciplinary governance, aiding in accountability and assessment of indirect costs (Abeysekera & Sharma, 2023). It enables better control of expenses and clarifies roles and responsibilities within organizations (Demeestère, 2000; Petera & Šoljaková, 2020). ABC, by precisely determining

the costs of activities, facilitates the setting of budgetary objectives and strengthens internal governance by allowing more transparent and legitimate management (Letort, 2016; Siverbo et al., 2019). In conclusion, modern management control tools, through a diagnostic perspective, play a crucial role in the disciplinary governance of organizations. They offer means of aligning behaviors, assessing performance, and ensuring accountability of actors while considering the unique characteristics of organizational and sectoral contexts. These tools, constantly evolving, continue to shape governance practices to meet contemporary challenges.

H3.1: The diagnostic use of modern management control tools allows for better control of the delegations that leaders entrust to actors within public establishments.

Behavioral Governance through Modern Management Control Tools: An Interactive Use

Behavioral governance, supported by modern management control tools, adopts an interactive angle, transcending the limits of the diagnostic model to integrate interactive devices. As Quemener (2011) indicates, this approach emphasizes exchange and interaction within governance, paving the way for a more extensive internal governance that goes beyond strict strategy implementation to encourage its evolution towards new performance objectives. Bouquin (2004, 2008b, 2008a, 2011) and his collaborators (Bouquin & Fiol, 2007; Bouquin & Kuszla, 2014) highlighted the role of management control as a sentinel, ensuring alignment between strategy and daily execution. Simons (1994) and Quemener (2011) shed light on the need for an adaptive system, promoting dialogue at all organizational levels and recognizing the growing importance of information in new governance (Lepori & Bollecker, 2015). Charreaux (2011) and Pesqueux (2002) connected cognitive governance to interactive control levers, essential for managing organizational dynamics. The Balanced Scorecard (BSC) is presented as a central tool in this cognitive and behavioral governance, serving both as a planning mechanism and a platform promoting strategic agility (Kaplan & Norton, 2001b, 2001a; Otley, 2003; Simons, 1994). Bukh & Malmi (2005) and Naro & Travaillé (2011) valued the collective deliberation it encourages, thus fostering richer organizational learning. The BSC, far from being limited to a tracking tool, becomes a catalyst for strategic and participative governance, particularly in public and academic sectors (Augé et al., 2010; Miliones, 2000; Kaplan & Norton, 2001). Marsal (2010) noted a convergence between governance and management control, emphasizing the importance of cognitive governance and interactive control for the survival and success of organizations. Activity-Based Costing (ABC) is another fundamental instrument of cognitive behavioral governance, operating beyond simple calculation techniques to integrate dimensions such as judgment and intuition (Demeestère, 2000; Lorino, 1995; Pashkevich et al., 2023). Moisdon (1997) and Lorino (1995) distinguished its roles in learning and supporting organizational changes, while researchers like Hopwood and Nicolas et al. (2005) discussed potential dysfunctions related to its inappropriate use. Management accounting is thus conceptualized as a "language of scarcity" (Chatelain-Ponroy & Sponem, 2007), which raises awareness of resource limitations and influences behaviors. Puyou (2009) and Tu Tran &

Thi Tran (2022) emphasized that accounting indicators are not merely fixed but emerge from an interactive governance process. In conclusion, behavioral governance through modern management control tools represents a dynamic and interactive approach, fostering informed decision-making, organizational change, and more adaptive resource management in a complex and constantly evolving environment.

H3.2: The interactive use of modern management control tools allows for better organization of decision-making processes within public establishments.

RESEARCH METHODOLOGY

In this study, we have adopted a stratified sampling method based on the nature and sector of activity of the establishments to select our sample. Consequently, a questionnaire was distributed to 139 public establishments in Morocco, of which we received 81 correctly completed responses, corresponding to a response rate of 58%. For the analysis of the collected data, SMART PLS 4 software was used. This analysis involved the use of structural equation modeling to test the hypotheses formulated in our research, as well as to evaluate the relevance of our research model.

Sample Characteristics

In this empirical study on public establishments in Morocco, the characteristics of the sample are analyzed according to several criteria. Regarding age, there is a diversity: 5 establishments are less than 5 years old, 29 are aged between 5 and 20 years, and the majority, 47 out of 81, are over 20 years old. This variety of ages offers perspectives for studying the impact on the adoption of modern management control tools. In terms of size, based on the number of employees, the sample is divided into three categories: 10 establishments have fewer than 100 employees, 22 have between 100 and 1000 employees, and 49 have more than 1000 employees. This diversity in sizes influences the use and effectiveness of management control tools.

The sectoral analysis reveals a predominance of the social sector (health, education, training), which represents 37% of the sample, followed by housing, urban planning, and territorial development (18.05%), and tourism and handicrafts (8.64%). These proportions reflect the sectoral composition of the Moroccan public sector, indicating the uniform interest of different sectors in management control tools. Finally, the study distinguishes between commercial activities (17.28% of the establishments) and non-commercial activities (82.72%). This distinction underlines the predominance of non-commercial activities in the Moroccan public sector. The analysis suggests that, despite their different nature, all establishments show a similar interest in new management control tools, although their application may vary according to the nature of their activities.

The descriptive analysis of leader's training among surveyed public establishment leaders in Morocco (Table 2) reveals a distinction between those with managerial and non-managerial backgrounds. Of the surveyed leaders, 33 have managerial training, indicating specific skills in areas such as strategic management, finance, human resource management, and marketing. This suggests a deep understanding of

Table 1. The characteristics of the surveyed establishment (N = 81).

Frequency			Percentage (%)
Age	Less than 5 years	5	6.2
	From 5 to 20 years	29	35.8
	More than 20 years	47	58.0
Size	Less than 100	10	12.3
	From 100 to 1000	22	27.2
	More than 1000	49	60.5
Activity	Social, Health, Education, and Training	30	37.0
	Housing, Urban Planning, and Territorial Development	15	18.5
	Agriculture and Maritime Fishing	12	14.8
	Energy, Mining, Water, and Environment	8	9.9
	Infrastructure and Transportation	9	11.1
	Tourism and Handicrafts	7	8.6
Nature of Activity	Commercial Activity	14	17.3
	Non-commercial Activity	67	82.7

management principles and best practices, enabling them to make informed decisions, efficiently manage resources, and achieve organizational goals. In contrast, 48 surveyed leaders lack managerial training, possibly implying experience gained in other fields or specialized skills in specific sectors. Examining the experience of surveyed leaders further, 17 of them have less than 4 years of experience, suggesting relative newness to their leadership role and potential ongoing learning and adaptation. While these leaders bring fresh perspectives, they may also face challenges due to their limited practical experience in managing an organization. On the other hand, 64 surveyed leaders have more than 4 years of experience, indicating significant expertise in leadership roles and a likely in-depth understanding of public establishments' operations. These experienced leaders are likely to possess a comprehensive understanding of the specific challenges and opportunities faced by public establishments, along with proven management skills to address them.

Table 2. Respondents' demographic profiles (N = 81).

		Frequency	Percentage (%)
Leader's Training	Management	33	40.7
	Non-management	48	59.3
Years of experience	Less than 4 years	17	21.0
	More than 4 years	64	79.0

Data Collection Tools

The operationalization of contingency variables is primarily influenced by the research conducted by Meyssonier

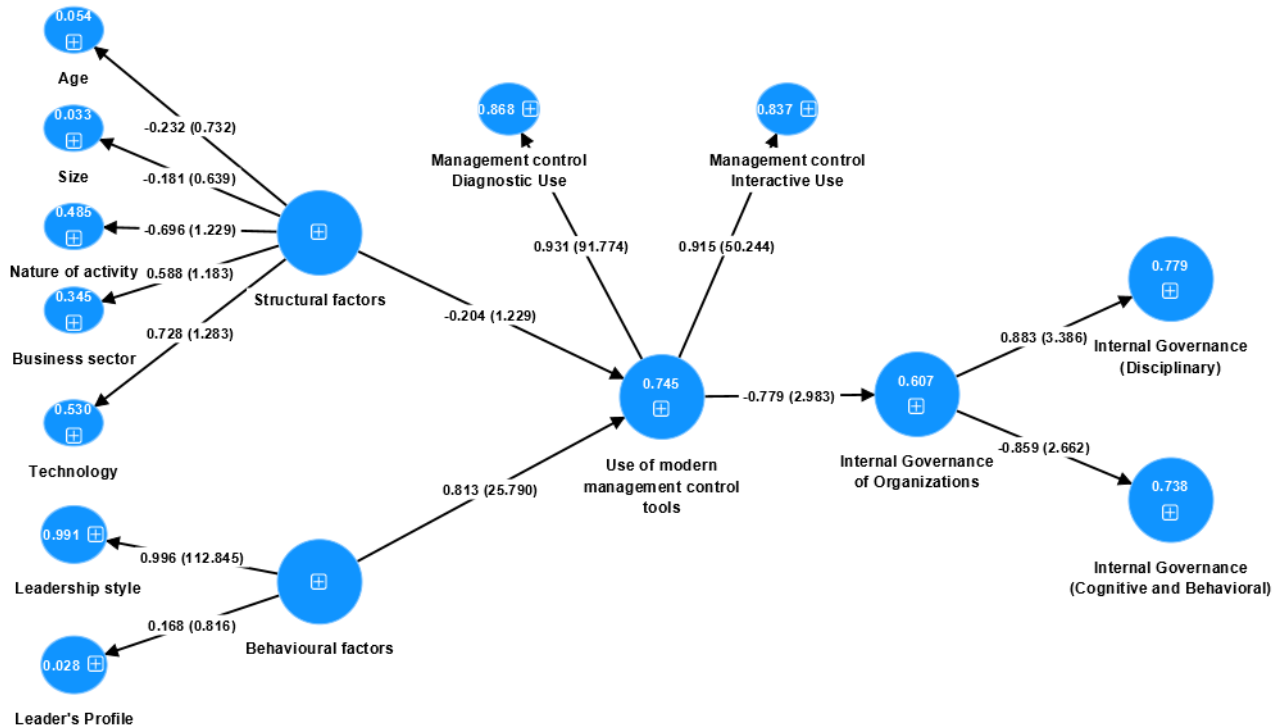
(2019), Jellouli (2011), Komarev (2007), Boitier (2002), Gary Yukl *et al.* (2002), Bayad & Nebenhaus (1999), and Greiner (1998). Adjustments were made to consider the specificities of public establishments and leaders in Morocco. Concerning structural contingency factors (SF), the selected sub-variables include age (A), size (S), nature of activity (NA), business sector (BS), and technology (TECH). As for behavioral contingency factors (BF), our focus is on leaders of public establishments, studying sub-variables such as the leadership style (LS) and the leader's profile (LP). Additionally, the operationalization of use of modern management control tools (UMMCT) used by leaders of public establishments involves two selected sub-variables, namely Management control diagnostic use (MCDU) and Management control interactive use (MCIU), drawing inspiration from the studies of Naro & Travaillé (2011), Berland *et al.* (2005), and Simons (1994). Finally, to measure the internal governance of public establishments, two sub-variables are retained, namely disciplinary (IGD) and cognitive, and behavioral (IGCB) (Charreaux, 1997, 2002, 2011; Gérard Charreaux & Wirtz, 2006; Sundaramurthy & Lewis, 2003).

FINDINGS

The structural model underwent analysis using SmartPLS 4, a software tool for structural equation modeling, to examine the hypothetical relationships among structural contingency factors (Age, Size, Nature of activity, Business sector, Technology), behavioral contingency factors (Leadership style, Leader's profile), use of modern management control tools (Management control - Diagnostic use, Management control - Interactive use) toward the dependent variable, which is the internal governance of Moroccan public establishments (Disciplinary, Cognitive, and Behavioral).

Table 3. Results of reliability, convergent and discriminant validity.

Construct	CA	CR	rho_a	AVE	MCDU	MCIU	IGD	IGCB	LS	UMMCT
MCDU	0.952	0.969	0.953	0.912	0.955					
MCIU	0.991	0.994	0.991	0.982	0.699	0.991				
IGD	0.890	0.948	0.895	0.900	0.838	0.735	0.949			
IGCB	0.829	0.898	0.836	0.747	-0.564	-0.386	-0.520	0.864		
LS	0.987	0.994	0.987	0.987	0.946	0.565	0.787	-0.556	0.994	
UMMCT	0.950	0.961	0.952	0.803	0.925	0.918	0.854	-0.517	0.835	0.896

**Fig. (1).** The adjusted structural model (Bootstrapping).

In the results of our structural equation analysis (Table 3), particularly in the model validation phase, we observe that the Cronbach's Alpha (CA) for all variables exceeds 0.7, along with Composite reliability (CR) and Rho_A values also surpassing 0.7 and 0.5 for the Average variance extracted (AVE). These findings indicate a strong convergent validity for the measurement model. This outcome aligns with the scientific standards in the field of management science, as advocated by Hair et al. (2006) and Tenenhaus (1999). Regarding the discriminant validity test results (Fornell-Larcker Criterion), they demonstrate that the diagonal value is higher than all values below it, confirming the discriminant validity of the scale. This observation suggests that the measured elements are strongly correlated with their respective structures but exhibit weak correlations with other structures. Consequently, the data affirm the scale's ability to effectively distinguish between different variables, thus validating the discriminant validity of the measurement model.

Table 4. Results of R² and Q².

Construct	R ²	Q ²	Interpretation
Use of modern management control tools	0.745	0.793	Significant
Internal governance of organizations	0.607	0.629	Significant

The results presented in Table 4 confirm that the R² values for the two endogenous constructs, use of modern management control tools and internal governance of organizations, exceed 0.600, being 0.745 and 0.607, respectively. This indicates a strong level of determination for these variables. Additionally, all Q² scores are positive, underscoring their robust predictive relevance (Hair et al., 2006). Finally, the calculated GoF value stands at 0.768. According to the standard set by (Wetzels, et al., 2009), our model's Gof value

Table 5. Bootstrap results of the first hypothesis.

Hypothesis	Relation	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T statistics	P values	Result
H1	SF => UMMCT	-0.204	0.013	0.166	1.229	0.219	Rejected
H1.1	A => UMMCT	0.140	0.137	0.067	2.094	0.036	Accepted
H1.2	S => UMMCT	-0.081	-0.081	0.071	1.150	0.250	Rejected
H1.3	NA => UMMCT	0.056	0.055	0.056	1.005	0.315	Rejected
H1.4	BS => UMMCT	-0.031	-0.033	0.062	0.498	0.618	Rejected
H1.5	TECH => UMMCT	-0.185	-0.191	0.064	2.870	0.004	Accepted

Table 6. Bootstrap Results of the second hypothesis.

Hypothesis	Relation	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T statistics	P values	Result
H2	BF => UMMCT	0.813	0.821	0.032	25.790	0.000	Accepted
H2.1	LS => UMMCT	0.769	0.765	0.041	18.945	0.000	Accepted
H2.2	LP => UMMCT	0.015	0.017	0.067	0.230	0.818	Rejected

Table 7. Bootstrap Results of the third hypothesis.

Hypothesis	Relation	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T statistics	P values	Result
H3	UMMCT => IGO	-0.779	-0.743	0.261	2.983	0.003	Accepted
H 3.1	MCDU => IGO	-0.564	-0.573	0.102	5.500	0.000	Accepted
H 3.2	MCIU => IGO	0.735	0.740	0.073	10.055	0.000	Accepted

(exceeding 0.36) is satisfactory, affirming the model's good quality of fit in PLS analysis.

The analysis results reveal (Table 5) that structural factors do not exert any influence on the use of modern management control tools in public establishments. This outcome is elucidated by a p-value of 0.219, significantly surpassing the accepted error threshold of 0.05. Consequently, the rejection of our hypothesis H1 is warranted. These identical findings extend to the examination of the relationship between age (H1.1), size (H1.2), nature of activity (H1.3), business sector (H1.4), technology (H1.5), and the use of modern management control tools. Initially, both age and technology are correlated with the variable "use of modern management control tools": ($T = 2.094$, $p < 0.05$) and ($T = 2.870$, $p < 0.01$). The positive result of these two sub-hypotheses validates H1.1 and H1.5. Subsequently, the results indicate a negative impact of both sub-variables "Size" on the variable "use of modern management control tools" ($T = 1.150$, $p > 0.05$), as well as the sub-variable "Nature of activity" and "business sector" ($T = 1.005$, $p > 0.05$), ($T = 0.498$, $p > 0.05$) on the variable "use of modern management control tools". This contradicts the three sub-hypotheses H1.2, H1.3, and H1.4.

The results of the second hypothesis H2 (Table 6) reveal a significant relationship between behavioral factors and the use of modern management control tools at the 0.01 significance level, with a positive standard Beta coefficient reflecting a moderate influence of 0.813. This influence is particu-

larly pronounced in the association between the leadership style and the use of modern management control tools (H2.1), with a significance threshold of 0.000 and a low Beta of 0.769. The findings of the first sub-hypothesis H2.1 demonstrate a significant relationship, with a T-statistic of 18.945 and a P-value less than 0.01. This result allows us to accept our first sub-hypothesis, affirming that indeed the leadership style positively influences the use of modern management control tools. However, regarding the relationship between the leader's profile and the use of modern management control tools, it is evident that there is no significant association, as the p-value exceeds the 0.05 threshold. Consequently, we will reject this sub-hypothesis H2.2.

The analysis of the direct effect of use of modern management control tools on the internal governance of organizations (Table 7) yields a significant result with an error threshold of 0.003 and a standard Beta of -0.779. This indicates a meaningful influence relationship between these two variables. The first sub-hypothesis demonstrates a moderately significant impact at the 0.01 threshold with a Beta of -0.564. This result allows us to accept hypothesis H3.1, affirming an influential relationship between the diagnostic use of modern management control tools and the internal governance of organizations. The second sub-hypothesis has also been accepted, as it shows a significance well below the error threshold, albeit with a low Beta. This indicates that the interactive use of modern management control tools contributes to the enhancement of internal governance in organizations. The analysis of empirical research data has led to sig-

nificant results. These findings synthesize that two of the main hypotheses in our research have been empirically verified and supported.

DISCUSSION

Our findings have illuminated an inverse relationship between structural contingency factors, such as size, sector, and nature of activities of Moroccan public establishments, and the use of modern management control tools. This observation contradicts previous studies, which indicated an use of modern management control tools based on these factors (Ahsina et al., 2014; Jellouli, 2011; Ngongang, 2013). Furthermore, this study suggests that the size of the establishments is not a major determinant in the use of these modern practices. Our analysis reveals that the need for a balanced and effective management control system transcends the realm of commercial entities, extending to non-commercial ones, including those in the social sector. This trend is reinforced by changes in state budget policies, highlighting the importance of a control system capable of meeting regulatory requirements and supporting long-term strategic management. Additionally, the varied use of modern management control tools among different establishments can be attributed to other structural contingency factors, such as age and technology. Small establishments tend to adopt these tools to strengthen oversight, while older ones use them more interactively, favoring self-discipline and teamwork.

Moreover, establishments that have embraced advanced information technologies have succeeded in leveraging the benefits of 'modernized' management control. This success is due to these technologies' ability to facilitate the dissemination, processing, and conversion of information throughout the organization, thereby alleviating some responsibilities from management and employees and promoting more interactive management control. This result is consistent with the majority of theoretical and empirical research that has analyzed the relationship between technology, age, and the use of modern management control tools (Boitier, 2002; Davila, 2005; Maurel, 2002; Mawadia et al., 2016; Meyssonier, 2019; Meyssonier & Pourtier, 2006; Ngongang & Njojo, 2018; O'Connor et al., 2004).

Regarding behavioral factors, our study reveals that leadership style significantly influences the use of modern management control tools. Leaders who encourage innovation, open communication, and change tend to promote an interactive use of these practices, while those focused on tasks favor a more diagnostic approach. However, factors such as the training and seniority of leaders do not seem to significantly influence the use of these tools.

Finally, the results of the third hypothesis reveal that differentiation in the use of modern management control tools, like the balanced scorecard and activity-based costing, positively influences their contribution to the improvement of internal governance in public establishments. Specifically, the first accepted sub-hypothesis emphasizes that the diagnostic use of modern management control tools improves control over delegations entrusted to actors within public establishments, thereby enhancing transparency and accountability. Similarly, the second accepted sub-hypothesis

highlights that the interactive use of these new tools of management control promotes better organization of decision-making processes, facilitating communication and collaboration, and leading to more effective and enlightened governance.

The results of the third hypothesis confirm those reached by some authors who found that the differentiation in the use of modern management control tools influences their contributions to improving the internal governance of public establishments (Bouquin, 2004, 2008; Bouquin & Kuszla, 2014; Charreaux, 2011; Quemener, 2011; Sargiacomo, 2008; Quemener, 2011; Kaplan, 2009; Kaplan et al., 1996; Kaplan & Norton, 2001; Kaplan & Norton, 2001a, 2001b, 2003; Naro & Travaill , 2010, 2011).

CONCLUSION

The increase in autonomy of public establishments within the context of effective public management has initiated a shift towards innovative governance models. Propelled by the Organic Law on Public Finances, these establishments are at a crossroads, facing unique challenges while seizing opportunities arising from their enhanced autonomy. This independence fosters the use of modern management control tools, which impose on leaders a continuous responsibility and justification of their actions, while promoting a participative dynamic that values listening and collaboration.

However, it is crucial to note that these tools are not universally applicable. A thorough analysis of the factors influencing their use is indispensable. Our study, focused on Moroccan public establishments, explores the impact of structural and behavioral contingency factors on the adoption of the balanced scorecard and activity-based costing for renewed governance. The results obtained from structural equation models challenge previous assumptions, showing that variables such as size, sector, and the nature of activities have a relatively limited impact on the use of these tools. In contrast, factors like seniority and technological advancements emerge as more significant influences. Crucially, our research highlights the importance of leadership style in facilitating an environment conducive to innovative management practices.

Significantly, our findings indicate that the specific application of tools such as the balanced scorecard and activity-based costing leads to a notable improvement in internal governance. This translates into better control of delegations and optimization of decision-making processes, resulting in more effective, transparent, and accountable governance.

In summary, our research sheds new light on the use of modern management control tools in the Moroccan public sector, underlining the necessity for used and flexible approaches that take into account institutional and technological peculiarities. These discoveries pave the way for future research on the application and effectiveness of management control tools in various cultural and organizational contexts.

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