

“Management innovation and transformation of management control in Moroccan enterprises”

AUTHORS	Meriem Rachid 
	Ahmed El Hammoumi 
	
	Nabil Seghyar 
	
ARTICLE INFO	Meriem Rachid, Ahmed El Hammoumi and Nabil Seghyar (2026). Management innovation and transformation of management control in Moroccan enterprises. <i>Problems and Perspectives in Management</i> , 24(3), 884–897. doi: 10.21511/ppm.24(3).2026.53
DOI	http://dx.doi.org/10.21511/ppm.24(3).2026.53
RELEASED ON	Wednesday, 30 September 2026
RECEIVED ON	Saturday, 24 January 2026
ACCEPTED ON	Tuesday, 25 August 2026
LICENSE	
	This work is licensed under a Creative Commons Attribution 4.0 International License
JOURNAL	"Problems and Perspectives in Management"
ISSN PRINT	1727-7051
ISSN ONLINE	1810-5467
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

25



NUMBER OF FIGURES

1



NUMBER OF TABLES

11

© The author(s) 2026. This publication is an open access article.



BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine
www.businessperspectives.org

Type of the article: Research Article

Received on: 24th of January, 2026

Accepted on: 25th of August, 2026

Published on: 30th of September, 2026

© Meriem Rachid, Ahmed El Hammoumi, Nabil Seghyar, 2026

Meriem Rachid, Dr., Associate Professor Candidate, Department of Economics and Management, Faculty of Economics and Management Fès, Sidi Mohamed Ben Abdellah University, Morocco.

Ahmed El Hammoumi, Dr., Associate Professor Candidate, Department of Economics and Management, Faculty of Economics and Management Fès, Sidi Mohamed Ben Abdellah University, Morocco. (Corresponding author)

Nabil Seghyar, Dr., Assistant Professor, Department of Economics and Management, Faculty of Economics and Management TAZA, Sidi Mohamed Ben Abdellah University, Morocco.



This is an Open Access article, distributed under the terms of the [Creative Commons Attribution 4.0 International license](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted re-use, distribution, and reproduction in any medium, provided the original work is properly cited.

Conflict of interest statement:

Author(s) reported no conflict of interest

Meriem Rachid (Morocco), Ahmed El Hammoumi (Morocco), Nabil Seghyar (Morocco)

MANAGEMENT INNOVATION AND TRANSFORMATION OF MANAGEMENT CONTROL IN MOROCCAN ENTERPRISES

Abstract

This paper aims to assess how recent changes in the management and organization of Moroccan companies lead to major transformations in their management control systems. The study examines digitization of processes, organizational flexibility, transversality, and new management practices that are participatory and adaptive, to demonstrate how they determine the transformation of management control systems into more strategic and effective approaches.

The empirical study used data collected in 2025 from 110 Moroccan companies operating in different sectors. The sample was developed using a non-probabilistic convenience sampling method due to limited access to companies and internal management data. Of the 380 questionnaires distributed, 122 responses were received, and 110 were retained after data quality checks. Managers, management controllers, financial officers, and administrative officers completed a structured survey questionnaire to collect data. This study used a quantitative research method; the validity of the measurement scales was verified using PCA and reliability tests (Cronbach's alpha), and the five proposed research hypotheses were tested using multiple regression analysis.

The results show that digitalization is the main driver of changes in management control systems, followed by organizational flexibility, transversality, and the adoption of new management practices. Although participation and adaptive management contribute positively to management control systems, their impact remains relatively lower than the previously mentioned factors. Overall, management control systems of Moroccan companies are evolving toward interactive, strategic, and performance-oriented models due to digital transformation and organizational transformation.

Keywords

management control evolution, organizational transformation, new management methods, digitalization, Moroccan firms

JEL Classification

M41, M10, O33, L25

INTRODUCTION

Organizational changes have taken place for many decades, not least due to globalization and competition but also due to digitalization of activities and wider social developments. This has led to the emergence of new management and organizational forms that are less rigid, cross-functional, team-based, and results-oriented (Appelbaum et al., 2017; Birkinshaw, 2024; Teece, 2018). More agile, collaborative, and learning-oriented forms of organization are increasingly displacing traditional hierarchical forms in which decisions are centralized, and processes are tightly controlled.

These organizational changes also affect management systems, particularly management control. After focusing mainly on budgetary control, cost management, and verifying compliance with financial objectives, management control should now evolve toward a more strategic role through decision support systems, value creation for stakeholders,

and overall performance management (Otley, 2016; Merchant & White, 2017). In this context, financial controllers are not just a mere supplier of accounting information; they increasingly assume the role of commercial partner, coordinating stakeholders and translating high-level strategic guidelines into operational figures (Goretzki & Messner, 2019).

In Morocco, this transformation of the productive apparatus is part of a particular context that includes economic reforms but also a progressive modernization of the productive fabric and an increased concern for competitive companies. The development of digital technologies, the emergence of new organizational working methods, and the increased openness of Moroccan companies to international markets require the adaptation of management practices and control tools (El Ansari, 2021). Nevertheless, despite the importance of these developments, empirical research remains relatively limited on the impact of new management and organizational methods on the development of management control in Morocco.

1. LITERATURE REVIEW AND HYPOTHESES

This review focuses on changes in management and organizational forms and their implications for the development of management and control of organizations. Organizational changes in today's world, such as digitalization, agility, transversalization, and the pursuit of global performance, challenge traditional management control models and require renewing their design and roles. In this respect, recent literature emphasizes an evolving redefinition of management control, moving beyond budgetary control to integrate into strategic steering and management support.

This review is integrative and has a dual objective: to analyze the main contributions to new management and organizational models while considering the conceptual evolution and empirical advances in control systems. It also highlights how these elements move through research dynamics and resist stabilization, an underexplored phenomenon, especially in the context of emerging economies. Such analysis serves to locate the current study and provide a solid basis for formulating research hypotheses.

Recent managerial literature already discusses important changes in management practices (a progressive move away from bureaucratic weight toward more flexible, interactive, project-oriented forms). These new ways of managing are rooted in the decentralization of decision-making (and responsibility), the empower-

ment of agents, and the valorization of human capital as an engine for both performance and innovation (Appelbaum et al., 2017).

New management and organizational techniques are reinventing organizational processes by favoring agility, flexibility, team autonomy, and cross-functionality, while integrating digital technologies and collaborative approaches to create less hierarchical organizational forms that promote networking, cross-functional cooperation, and responsiveness to environmental changes (Aghion et al., 2023).

The coexistence of traditional and modern organizational structures in Morocco offers a valuable field of study for assessing the impact of new management practices on management control systems, justifying an analytical approach focused on the evolution of management control in Moroccan companies (Strauß & Zecher, 2013).

However, as organizations grow more complex and their environments become more turbulent, management control has changed dramatically. Several studies indicate that it has expanded into global performance management, based on non-financial dimensions such as quality, innovation, customer satisfaction, or social responsibility (Ferreira & Otley, 2009). Such transformation is accompanied by the emergence of new instruments, i.e., balanced scorecards, KPIs, and integrated reporting systems.

The role of management controllers has evolved: they now act as a strategic partner and support for

decision-making, integrating complexity, transversality, and responsiveness. This evolution creates tensions between autonomy and control, but allows rethinking the function of control as a strategic lever for flexibility, efficiency and value creation within the organization (Simons, 1994).

In this vein, studies across geographies conclude that new modes of management and organization reposition, rather than weaken or dissolve, management control (though unintended pathways can lead in different directions depending on institutional and cultural context) (Goretzki & Messner, 2019). In Europe, some evidence suggests a shift toward more interactive, strategic control mechanisms aligned with lean principles, as they relate to autonomy, learning, and cross-functionality in agile organizations (Simons, 1994; Ahrens, 2018). In North America, Merchant and White (2017) emphasize results-based and accountability systems emerging alongside decentralization, resulting in saturation with control instruments through performance indicators and incentive mechanisms, which implies increased over-instrumentation. Asian literature points to hybrid controls that combine formal and informal mechanisms deeply embedded in an organization's culture to balance flexibility with coherence (Burns & Scapens, 2000). Finally, research on early industrialization shows that new management practices are accompanied by incremental, limited changes in management control systems that are highly contingent on institutional conditions and organizational capabilities, making location-specific studies advisable (Tessier & Otley, 2012). The objective of new organizational and managerial approaches is to reconcile performance, innovation, and agility by adapting organizations' structures, processes, and modes of collaboration, while emphasizing the need for careful empirical studies, especially in the Moroccan context, to assess the impact of these transformations on management control.

The review also contributes to understanding the practical consequences for management methods and control, which many empirical studies examine separately but still find limited cross-study evidence when considering an interaction perspective (as in transition countries like Brazil). From this perspective, Moroccan companies undergoing a transition from modern to more modern

management are a promising setting for better understanding how new managerial and organizational patterns shape the evolution of management control mechanisms.

Therefore, the current study seeks to contribute to the field's understanding of changes in management control against the backdrop of current organizational change, with particular reference to Morocco.

The literature review also shows a growing consensus that new management and organizational forms do not debilitate managerial control but rather restructure it. International literature on coordination supports the view that as agility, transversality, and autonomous managerial decisions increase, control systems shift toward more interactive mechanisms, moving from budgetary control to interactive management of strategy and learning (Henri, 2006). However, these transitions remain highly contextual, shaped by the institutional, cultural, and organizational settings that define each context (Chenhall, 2003).

Despite extensive research on managerial change and the development of management control, several gaps remain. First, the literature is fragmented and investigates new managerial practices or controls separately, disregarding their interaction in a systematic manner. Second, empirical research concentrates on the development of economies in general and emerging economies in particular. Third, there is limited evidence on a combined analysis of the organizational changes and the shifts in the roles and instruments for control within individual firms.

These gaps are even more pronounced in the Moroccan context, where firms follow heterogeneous modernization paths that incorporate traditional management practices as well as more innovative management systems. This coexistence of models creates a valuable empirical space to examine how new tools shape the evolution of management control, not only in terms of instruments but also in terms of functions and uses.

In light of this literature review, our study aims to examine the impact of new forms of governance on management control practices and roles within

Moroccan companies. Following a hypothetico-deductive logic and considering the literature, the following hypotheses are considered:

- H1: New methods of management and organization have a significant impact on the development of Management Control Systems (MCS) in Moroccan firms.*
- H2: The use of more participative and agile modes of management encourages a reorientation of management control toward a more strategic form, aimed at supporting decision-making.*
- H3: The evolution of organizational features toward greater transversality and flexibility is related to a variety of selection tools, including non-financial measures and global performance monitoring systems.*
- H4: The digitalization of organizational processes leads to more dynamic and integrated management control practices.*
- H5: The new management intensity is positively related to the transformation of the management controller's role as a business partner.*

These assumptions are intended to be tested empirically to understand how managerial and organizational changes affect the evolution of management control in Moroccan cases. Figure 1 shows the conceptual model.

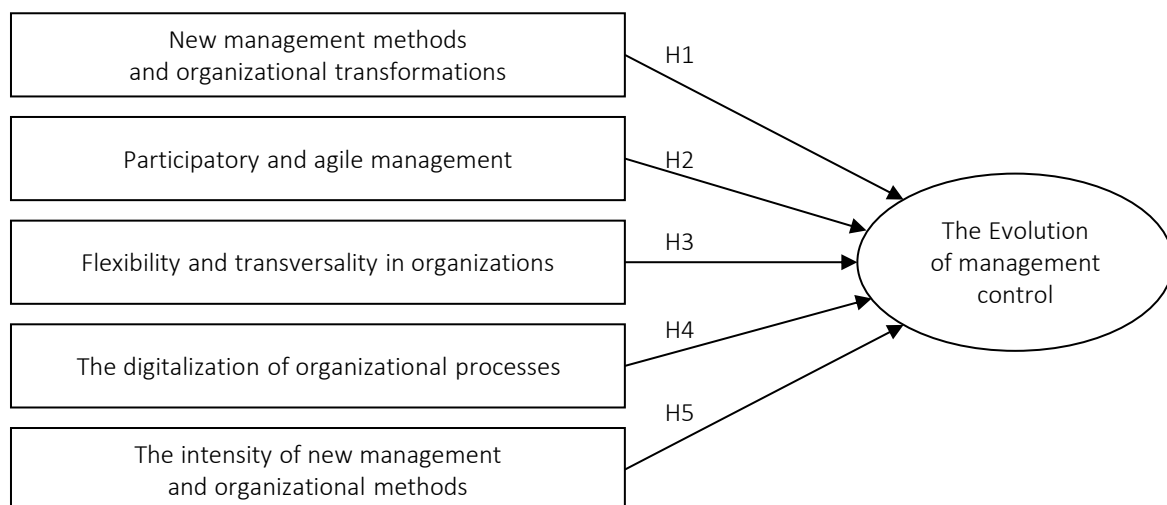


Figure 1. Conceptual framework

2. METHOD

This section outlines the methodology used to achieve the research objectives and verify the hypotheses. It describes the design of the research, the sampling method, and data collection, presentation of variables and their measurement, as well as statistical means of data analysis used to arrive at the findings discussed in the next section.

2.1. Data collection

After constructing the questionnaire to operationalize our research constructs, we conducted a pre-test with a small group of respondents. This approach allowed us to verify the clarity of the questions, their internal consistency, and their conceptual relevance, particularly the items related to the evolution of management control, new management practices, and organizational changes.

Our analysis targets Moroccan companies of different sizes involved in managerial and organizational change processes. These companies operate in environments marked by structural changes, notably the digitalization of processes and the evolution of flexible management practices as well as performance management systems. As such, they constitute a particularly relevant field for studying the evolution of management control.

To our knowledge, no exhaustive national database in Morocco specifically identifies companies that have undergone managerial and organizational

transformation processes. To mitigate this limitation, several sources of information were used to construct the survey framework, including:

- Professional social networks and corporate databases;
- Institutional portals for Moroccan SMEs;
- The associations of accountants, audit firms, and consulting firms;
- Personal contacts made through professional networks;
- Employers and professional organizations.

Accordingly, from these diverse sources we were able to identify a set of 2,152 Moroccan companies covering a broad range of economic sectors and geographical areas, which were contacted by telephone to prepare an initial database with potentially interested companies on the topic studied. The selection of eligible companies for the study was based on two criteria:

- The pressures of developing managerial and organizational methods;
- The existence of a structured management system or performance management tools.

The questionnaire was addressed to CEOs, CFOs, management controllers, line managers, and other decision-makers with sufficient knowledge of managerial practices and organizational change processes within their companies. Using the screening procedure, we identified 966 eligible companies over the reference period 2020–2025. Among them, 380 companies were selected and contacted to participate in the survey. Of the 380 questionnaires distributed, 122 complete responses were received, corresponding to a response rate of 32.1%. After checking completeness, consistency, and response quality, 110 valid questionnaires were retained for statistical analysis.

Given the use of a non-probabilistic sampling method, the findings should not be interpreted as statistically representative of all Moroccan companies. Rather, they provide empirical evidence on companies that meet the eligibility criteria and are engaged to varying degrees, in managerial and organizational transformation processes.

To address potential response and non-response bias, the characteristics of usable and excluded questionnaires were reviewed. In addition, where available, observable characteristics of responding and non-responding companies, such as sector, size, and geographical location, were compared. The final sample was considered acceptable for exploratory multivariate analyses to further test the

Table 1. Characteristics of the final sample

Characteristics	Categories	Frequency	Percentage (%)
Sector of activity	Industry	28	25.5
	Services	32	29.1
	Trade	18	16.4
	Construction	12	10.9
	Finance and insurance	8	7.3
	Technology and digital services	12	10.8
	Very small enterprises (<10 employees)	18	16.4
Firm size	SMEs (10–249 employees)	74	67.3
	Large companies (≥250 employees)	18	16.3
	Private companies	82	74.5
Firm type	Public/semi-public organizations	12	10.9
	Subsidiaries of national/international groups	16	14.6
	CEOs/General managers	24	21.8
Respondents' positions	CFOs/Financial managers	18	16.4
	Management controllers	36	32.7
	Operational/Administrative managers	32	29.1
	Less than 5 years	22	20.0
Professional experience	5–10 years	46	41.8
	More than 10 years	42	38.2

Table 2. Non-response bias test (early vs. late respondents)

Variables	Early respondents (n = 55)	Late respondents (n = 55)	p-value
Digitalization of processes	3.84	3.79	0.642
Organizational flexibility	3.76	3.81	0.711
Participatory management	3.68	3.72	0.754
Evolution of management control	3.91	3.86	0.596

relationships between new managerial practices, organizational transformations, and the evolution of management control systems. Table 1 presents the main characteristics of the selected sample.

Table 1 shows that the final sample of 110 Moroccan companies shows sectoral and organizational diversity. Service (29.1%) and industrial (25.5%) companies are the most represented categories, while SMEs dominate the sample with 67.3%. Respondents are mainly management controllers (32.7%) and operational/administrative managers (29.1%), having mainly more than five years of experience. This diversity of profiles reinforces the relevance of the data collected to analyze the impact of managerial and organizational transformations on the evolution of management control systems.

To verify that the study results are not affected by non-response bias, we compared the first and last respondents. Late respondents are generally considered to be a proxy for non-respondents, as they often have characteristics closer to the latter. Table 2 presents the results of this comparison on the main variables of the model.

The non-response bias test shows no statistically significant differences between first and last respondents ($p > 0.05$). Thus, the non-response bias does not seem to pose a significant threat to the validity of our empirical results.

2.2. Data analysis procedure

The first analytical step was to check the validity and reliability of the variables included in our research model by principal component analysis (PCA) based on sets of items: one regarding management control's evolution and one relating to new management methods and organizational changes observed within Moroccan firms. This step aimed to assess the factorial structure, construct reliability, and conceptual relevance of the selected constructs,

following methodological advice in management science.

Second, a multiple linear regression analysis was used to examine the statistical relationships between the independent variables (representing new modes of management and organizational transformations) and the dependent variable, corresponding to the evolution of management control, as reflected in changes in roles, tools, and practices. This step makes it possible to estimate the strength and direction of the relationships of managerial and organizational changes on the change of the management control system in Moroccan companies.

2.3. Measurement model

We first ensured the reliability and validity of the measuring items for the theoretical model through principal component analysis to assess the factorial structure, validity, and reliability of the measurement scales; then, we were able to recode the variables in line with four stages (Evrard et al., 2003) described as follows.

First, Bartlett's test of sphericity and the Kaiser-Meyer-Olkin index (KMO, which have to do with the exploratory analysis of factorials in relation to the null hypothesis associated with a correlation of variables (Bartlett's sphericity), were used to determine whether the correlations between different variables used for determining the components category are high enough. A KMO value above 0.8 indicates that the factorial structure is understandable and stable, suggesting good factorability. When $0.5 < \text{KMO} < 0.8$, factorability is acceptable, but interpretability will be very difficult; when $\text{KMO} < 0.5$, factorability is poor.

Second, factor extraction consists of determining the number of components to retain from the initial set of items. We eventually remove those with a small contribution (0.500) to the main components identified step by step by Evrard et al. (2003). All

Table 3. KMO and Bartlett test

Kaiser–Meyer–Olkin Measure of Sampling Adequacy		.781
Bartlett’s sphericity test	Approx. Chi-square	1246,582
	(ddl)	253
	Sig.	.000

principal component analyses are further subjected to an orthogonal Varimax rotation, which facilitates the interpretation of the factorial structure by maximizing the variance of loadings across factors.

Third, reliability of factors for each principal component analysis is checked by assessing the consistency between the items of the same concept examined through measurement (Igalens & Roussel, 1998; Pittenger, 2003). According to Evrard et al. (2003) and Pittenger (2003), a measurement scale is reliable when it produces stable, internally consistent results under similar conditions. We used Cronbach’s alpha because multiple questions on the same phenomenon should all be proven reliable (Evrard et al., 2003). An alpha above 0.6 is acceptable in exploratory studies (Evrard et al., 2003).

Finally, exploratory factor analysis refined the initial constructs and confirmed the measurement structure retained for the empirical model. Table 3 summarizes the analysis results for the main explanatory variable components, presenting Cronbach’s alpha and Bartlett’s sphericity test.

The KMO value is 0.781, which indicates a good fit for factor analysis. In addition, the Bartlett

sphericity test is highly significant ($p > 0.001$), confirming that the correlation matrix is factorizable. These results validate the use of PCA.

Table 4 presents the eigenvalues and the percentage of total explained variance by the factors selected after performing an ACP. The results allow us to evaluate the variance explained by the extracted components and determine whether the factorial structure is a good representation of the information in the initial items.

We selected the six factors with eigenvalues greater than 1 according to the Kaiser criterion. The total explained variance is estimated at 62.49%, which is acceptable in management science research. This result means that the components (which have been selected) give a significant percentage of the information contained in the initial items.

Table 5 presents the results of exploratory factor analysis, factor loadings, communalities, and the internal reliability of the measurement scales.

All factor loadings exceed the recommended minimum of 0.50, ranging from 0.693 to 0.792, confirming that the items contribute satisfactorily to their respective constructs.

Table 4. Eigenvalues and explained total variance

Factor	Eigenvalue	% of variance	Cumulative %
New management methods and organizational transformations	3.214	13.97%	13.97%
Participatory and agile management	2.847	12.38%	26.35%
Flexibility and organizational transversality	2.563	11.14%	37.49%
Digitalization of organizational processes	2.216	9.63%	47.12%
Intensity of new management and organizational methods	1.894	8.23%	55.35%
Evolution of management control	1.642	7.14%	62.49%

Note: Extraction method: Principal component analysis (PCA).

Table 5. Factor loadings, communalities, and internal reliability of measurement scales

Component	Items	Factor loading	Communality	Cronbach’s Alpha
New management methods and organizational transformations	Adoption of flexible and participative management practices	0.742	0.611	0.762
	Evolution of work organization modes (project-based, agile, remote work)	0.768	0.634	
	Decentralization of decision-making processes	0.715	0.582	
	Organizational adaptability and operational efficiency improvements	0.731	0.604	

Table 5 (cont.). Factor loadings, communalities, and internal reliability of measurement scales

Component	Items	Factor loading	Communality	Cronbach's Alpha
Participatory and agile management	Employee involvement in decision-making processes	0.756	0.628	0.769
	Use of agile and collaborative work practices	0.781	0.649	
	Managerial flexibility supporting performance objectives	0.733	0.596	
Flexibility and organizational transversality	Organizational flexibility in work structures	0.724	0.587	0.749
	Transversal coordination across departments	0.758	0.619	
	Cross-functional collaboration mechanisms	0.771	0.641	
	Adaptive allocation of resources to performance needs	0.702	0.559	
Digitalization of organizational processes	Digitalization of core operational processes	0.718	0.574	0.705
	Use of digital tools for monitoring and reporting	0.741	0.603	
	Automation of management control activities	0.693	0.541	
	Real-time access to performance information	0.726	0.586	
Intensity of new management and organizational methods	Extent of adoption of new management practices	0.766	0.633	0.773
	Depth of organizational transformation initiatives	0.784	0.657	
	Intensity of managerial innovation across organizational processes	0.751	0.612	
Evolution of management control	Shift from traditional to strategic management control practices	0.773	0.648	0.785
	Integration of management control into strategic decision-making	0.792	0.671	
	Use of interactive control mechanisms	0.754	0.625	
	Development of performance dashboards and KPIs	0.769	0.642	
	Adaptation of control systems to organizational change	0.737	0.598	

The communalities are also acceptable because they all exceed the 0.50 threshold and show that the selected factor solution correctly represented these elements. The Cronbach's alpha coefficients of the scales used were between 0.705 and 0.785, which indicates a good internal consistency of the finally summarized scales.

2.4. Hypotheses testing through multiple linear regression

Multiple linear regression was used to examine the relationship between one dependent variable and several independent variables. This method consists of studying the correlation between dependent and independent variables that are expected to help justify what is presented as empirical fact. This relationship is modeled by a regression equation in which the response to be explained is defined as a linear combination of explanatory variable(s), weighted with their respective regression coefficients, plus an intercept term and random error term (Crauser et al., 1989).

This model is employed to test the hypotheses and make a global assessment of how new managerial practices and organizational changes affect the evolution of management control within Moroccan companies. It makes it possible to determine which of the explanatory variables are

relatively more important and/or statistically significant in explaining developments at the management control role, tool, and practice level.

The conceptual model is operationally expressed as the following regression:

Evolution of Management Control = $\beta_0 + \beta_1$ New management methods and organizational transformations + β_2 Participatory and agile management + β_3 Flexibility and organizational transversality + β_4 Digitalization of organizational processes + β_5 Intensity of new management and organizational methods + ϵ .

This analytical framework makes it relatively easy to empirically test the model suggested above and to demonstrate how much managerial and organizational changes are driving the evolution of management control in Moroccan companies.

A check of the variance inflation factor (VIF) and tolerance was carried out to assess the presence of multicollinearity among the independent variables. The VIF should be less than 10, while the tolerance values should not be too low, commonly above 0.10 or 0.20 depending on the adopted threshold.

Fisher-Snedecor test, or *F*-test, permits studying the statistical significance of the overall regression

Table 6. Coefficients of collinearity of variables in the research model

Model Tolerance		Collinearity Statistics
1	(Constant)	
	New management methods and organizational transformations	.562
	Participatory and agile management	.548
	Flexibility and transversality in organizations	.831
	The digitalization of organizational processes	.721
	The intensity of new management and organizational methods	.904

model. The overall contribution of the set of explanatory variables and the contribution of each explanatory variable and the contribution of each explanatory variable is assessed through the *F*-test, while the individual contribution of each predictor is assessed through the Student *t*-test.

The Student *t*-test permits testing whether the estimate of a non-standardized regression coefficient or a non-standardized regression coefficient β is significantly different from zero. Its *p*-value should be <0.05 at the 5% level or <0.01 at the 1% level of significance.

We examined VIF and tolerance values to ensure the independent variables were not affected by problematic multicollinearity. VIF should also be less than 10, and tolerance should be greater than 1.

In our case, multicollinearity is not a problem, as shown in Table 6, the tolerance values range from 0.5 to 0.9 and the VIF remains below 10. These results indicate the absence of problematic multicollinearity among the explanatory variables.

When confirming the hypothesis for the theoretical conception is no longer possible, we test the model's significance. Our analysis proceeds in two steps: first, global significance, and second, local significance.

3. RESULTS

The explanatory quality and overall significance of the regression model are evaluated through the

analysis of the explanatory power of the model and the global Fisher test. The individual effects of explanatory variables on the evolution of management control systems are examined from regression coefficients and significance levels. Finally, the hypotheses formulated in the conceptual model are tested and discussed.

3.1. Evaluation of the regression model quality and overall significance test

Table 7 presents the summary of the regression model and allows us to assess its explanatory quality through several statistical indicators, notably the correlation coefficient (*R*), the coefficient of determination (R^2), the adjusted coefficient of determination (R^2 adjusted), and the standard error of the estimate, as well as the Durbin–Watson statistic.

This observation is consistent with the adjusted coefficient of determination, R^2 adjusted (0.456), which also indicates the explanatory quality of the econometric model presented in Table 4. Thus, the model shows that variables related to managerial and organizational transformations of Moroccan companies explain 45.6% of the variance observed in the evolution of management control systems.

More specifically, process digitalization, organizational flexibility, and transversality, as well as new participatory and adaptive managerial practices,

Table 7. Summary of the model

Model	R	R^2	R-squared adjusted	Standard error of estimate	Edit statistics					Durbin–Watson
					Variation of R^2	Variation of F	ddl1	ddl2	Sig. Variation of F	
1	.675 ^a	.456	.430	.39578	.456	30.7873	5	104	.000	1.663

Note: a. Predictors: (Constant), New management methods and organizational transformations, participatory and agile management, flexibility and transversality of the organization, the digitalization of organizational processes, the intensity of new management and organizational methods. b. Dependent Variable: Evolution of management control.

Table 8. ANOVA model regression index

ANOVA ^a					
Model		Sum of Squares	Ddl	Mean Square	F
1	Regression	24.907	5	4.9814	30.7873
	Residual	16.827	104	.1618	
	Total	41.734	109		

Note: a. Predictors: (Constant), New management methods and organizational transformations, participatory and agile management, flexibility and transversality in the organization, the digitalization of organizational processes, the intensity of new management and organizational methods. b. Dependent Variable: Evolution of management control.

contribute significantly to explaining the transformation of management control systems toward more interactive, strategic, and performance-oriented devices. This result confirms that recent organizational changes play a decisive role in the modernization of management control within Moroccan companies.

Next, we examined the overall significance of the regression model, i.e., which set of predictors can predict the response factor. This test may be posed as follows: is there at least one important independent variable? The significance of the overall model was tested by means of the *F*-statistic, i.e., checking if the explanatory variables impact the variable to be explained or not.

The decision rule was based on comparison with the tabled Fisher value. SPSS 28 automatically reports the probability of the computed *F*-statistic, which makes analysis convenient; therefore, comparing the probability associated with the *F*-statistic at a critical level of 5% will suffice. If the probability associated with *F* is less than $\alpha = 5\%$, we can reject the null hypothesis in favor of the alternative hypothesis.

In the same way, in the case of the independent variables of the evolution of management control, the *F* statistic detected by the SPSS 28 program is $F = 30.7873$, and the probability associated with it is less than 1% ($p < 0.001$); for this reason, we can reject the null hypothesis and affirm that our model

is globally significant. Table 8 presents the results of the conceptual model test.

Table 9 presents the results of the major diagnostic tests used to validate the main hypotheses associated with applying linear regression. These tests focus on the absence of autocorrelation of the residuals, the normality of the error, the absence of multicollinearity between the explanatory variables, and the homoscedasticity of the residuals. The validation of these conditions confirms the robustness of the model and reinforces the reliability of the estimates from regression analysis.

Diagnostic tests confirm that the regression assumptions are met. The Durbin–Watson statistic (1.663) indicates no significant autocorrelation of the residuals. Moreover, the tolerance values and VIF coefficients confirm the absence of multicollinearity among the explanatory variables. Similarly, residual analysis shows homoscedasticity and an approximately normal distribution of the model's residuals, confirming the reliability of the estimated regression coefficients.

3.2. Individual significance test

The outcome of the multiple linear regressions highlights that all explanatory variables are positively and significantly associated with the development of management control in Moroccan companies. Digitalization of organizational routines most strongly drives ($\beta =$

Table 9. Regression diagnostic tests and verification of model assumptions

Test	Indicator	Value	Decision
Durbin–Watson test	Autocorrelation of residual	1.663	No autocorrelation problem
Normality test of residuals	Kolmogorov–Smirnov / Shapiro–Wilk	>0.05	Normal distribution
Variance Inflation Factor (VIF)	Multicollinearity	1.10–1.78	No multicollinearity
Tolerance	Collinearity diagnosis	>0.5	Acceptable
Scatterplot residuals	Homoscedasticity	Random distribution	Confirmed

Table 10. Coefficients of individual significance

		Coefficients ^a						
	Model	Non-standardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	95% Confidence Interval
		B	Error standard	Beta			Tolerance	
1	(Constant)	-.132	.462		-.286	.776		
	New management methods and organizational transformations	.261	.067	.228	3.897	.001	.562	[.128–.394]
	Participatory and agile management	.214	.095	.192	2.253	.026	.548	[.028–.400]
	Flexibility and transversality in organizations	.246	.089	.259	2.764	.007	.831	[.071–.421]
	The digitalization of organizational processes	.318	.083	.341	3.831	.000	.721	[.156–.480]
	The intensity of new management and organizational methods	.198	.091	.211	2.176	.031	.904	[.018–.378]

Note: a. Dependent Variable: Evolution of management control.

Table 11. Synthesis of hypotheses results

Hypotheses	Explanatory variables	Variables to explain	Coefficient β	Significance	t Student	Validation
H1	New management methods and organizational transformations	Evolution of management control	0.228	0.001	3.897	Confirmed
H2	Participatory and agile management	Evolution of management control	0.192	0.026	2.253	Confirmed
H3	Flexibility and transversality in organizations	Evolution of management control	0.259	0.007	2.764	Confirmed
H4	The digitalization of organizational processes	Evolution of management control	0.341	0.000	3.831	Confirmed
H5	The intensity of new management and organizational methods	Evolution of management control	0.211	0.031	2.176	Confirmed

0.341; $p < 0.001$) changes in management control instruments and practices. New forms of management and organizational changes show a markedly positive effect ($\beta = 0.228$; $p < 0.001$), as do organizational flexibility and transversality in workplaces ($\beta = 0.259$; $p = 0.007 < 0.01$). Moderate, significant effects are also found for participative and agile management ($\beta = 0.192$; $p = 0.026 < 0.05$) and the intensity of new management and organizational methods ($\beta = 0.211$; $p = 0.031 < 0.05$). The results generally validate that managerial and organizational transformations are major engines of change in management control practice in Morocco. The results are presented in Table 10.

The 95% confidence intervals assess the accuracy of the estimated coefficients. The absence of zero in these intervals confirms the statistical significance of the relationships tested and reinforces the robustness of the results.

The findings contribute to the efficiency of management control by aiding in the consumption of complex information and improving the quality of the decision-making process, as a result of new modes of management, organizational forms, and digitization. These advances strengthen the performance control and strategic consistency between goals and activities. Table 11 summarizes the results of hypothesis testing.

4. DISCUSSION

The regression analysis shows that five variables significantly explain the development of management control in Moroccan firms undergoing managerial and organizational change. These dimensions can be considered complementary elements of managerial innovation, organizational design, and digital transformation, which indicate that changes in management control do not correspond to attenuation but rather to an institutional reconfiguration of such mechanisms.

Digitization of organizational processes is also presented as the factor exerting the greatest impact on changes in management control ($\beta = 0.341$; $p < 0.001$). This finding implies that digital technologies help trigger a reconfiguration of management control tools by enabling real-time reporting, automating control devices, and increasing access to performance data. This result significantly confirms Hypothesis H4 and is in line with prior research highlighting the structuring effect of digitization on current management control systems (Rikhardsson & Yigitbasioglu, 2018; Otley, 2016).

Second, new management techniques and structural changes positively and significantly affect the development of control over managerial actions ($\beta = 0.228$; $p = 0.001$). This finding supports Hypothesis H1 and indicates that implementing a more flexible, decentralized, competency-based control system shifts control from tactical to strategic modes. This result is consistent with previous research emphasizing the role of managerial innovation in changing the purpose and operation of management control (Baird et al., 2019; Goretzki & Messner, 2019).

Third, organizational flexibility and transversality have a positive and significant effect on the evolution of management control ($\beta = 0.259$; $p = 0.007$), supporting Hypothesis H3. Thus, we can infer that the more complex the coordination among functions and the greater the flexibility of organi-

zational structure, the more pronounced the demands for control mechanisms, both integrated and transversal ones, will be to support a performance monitoring service across companies. This finding aligns with earlier studies on management control in agile and project-based organizations (Ahrens, 2018; Chapman, 2018; Foss & Saebi, 2018).

Fourth, participatory and agile management has a positive and significant impact on the development of management control ($\beta = 0.192$; $p = 0.026$), supporting Hypothesis H2. This, in turn, suggests that involving employees in decision-making and applying agile practices may stimulate a more interactive use of management control systems, thus supporting their use as devices for dialogue, learning, and decision support rather than simply means of compliance (Khanagha et al., 2022; Strauß & Zecher, 2013).

New management and organizational practices show an additional positive, statistically significant effect ($\beta = 0.211$; $p = 0.0031$), confirming Hypothesis H5. This finding indicates that the depth and consistency with which managerial innovations are introduced determine how much management control systems (MCS) changes. Incremental or superficial transfer does not seem sufficient to produce radical change, consistent with the contingent approach (Tessier & Otley, 2012) to introducing new management controls.

Taken together, these findings suggest that the change in management control in Moroccan firms results from a combination of digital, organizational, and managerial factors, with digitalization as an impact factor. They also emphasize the importance of situating management control change in emerging economies (where organizational change is incremental and embedded) within institutional and structural limitations. This interpretation is consistent with broader research on organizational transformation, dynamic capabilities, and managerial innovation (Birkinshaw, 2024; Teece, 2018).

CONCLUSION

This paper explores how neo-management and organizational changes influence the development of management control in Moroccan companies. Based on data from 110 companies, the results show that management control is changing and improving rather than worsening, with process digitalization

as the main driver of this change. Other factors like organizational flexibility, new management practices, employee involvement, and the level of change also play a role. These results raise the issue of the increasing role played by management control as a strategic and interactive system that contributes to decision-making and performance in changing organizations.

As such, this paper adds value to the literature by presenting localized empirical data from an emerging market and by broadening our understanding of management control through a contingency perspective outside of developed countries. From a managerial perspective, it highlights the importance of control systems and their adaptability to digital, organizational, and managerial change to improve their impact when they operate at the strategic level.

However, this study has some limitations due to its cross-sectional nature. Longitudinal and qualitative approaches in future research, as well as generalizations to other emerging economies, could contribute to knowledge on management control systems MCS evolution.

AUTHOR CONTRIBUTIONS

Conceptualization: Meriem Rachid, Ahmed El Hammoumi.

Data curation: Meriem Rachid, Ahmed El Hammoumi, Nabil Seghyar.

Formal analysis: Ahmed El Hammoumi.

Funding acquisition: Meriem Rachid, Ahmed El Hammoumi, Nabil Seghyar.

Investigation: Meriem Rachid, Ahmed El Hammoumi.

Methodology: Ahmed El Hammoumi.

Project administration: Meriem Rachid, Ahmed El Hammoumi.

Resources: Meriem Rachid, Ahmed El Hammoumi.

Software: Ahmed El Hammoumi.

Supervision: Meriem Rachid, Ahmed El Hammoumi, Nabil Seghyar.

Validation: Ahmed El Hammoumi.

Visualization: Meriem Rachid, Ahmed El Hammoumi, Nabil Seghyar.

Writing – original draft: Meriem Rachid, Ahmed El Hammoumi.

Writing – review & editing: Meriem Rachid, Ahmed El Hammoumi, Nabil Seghyar.

REFERENCES

1. Aghion, P., Bergeaud, A., & Van Reenen, J. (2023). The impact of regulation on innovation. *American Economic Review*, 113(11), 2894-2936. <https://doi.org/10.1257/aer.20210107>
2. Ahrens, T. (2018). Management controls that anchor other organizational practices. *Contemporary Accounting Research*, 35(1), 58-86. <https://doi.org/10.1111/1911-3846.12377>
3. Appelbaum, D., Kogan, A., & Vasarhelyi, M. A. (2017). Big data and analytics in the modern audit engagement: Research needs. *Auditing: A Journal of Practice & Theory*, 36(4), 1-27. <https://doi.org/10.2308/ajpt-51684>
4. Baird, K., Su, S., & Munir, R. (2019). Levers of control, management innovation and organisational performance. *Pacific Accounting Review*, 31(3), 358-375. <https://doi.org/10.1108/PAR-03-2018-0027>
5. Birkinshaw, J. (2024). Too little, too late? How policymakers and regulators respond to the business model innovations of digital firms. *Academy of Management Perspectives*, 38(3), 269-285. <https://doi.org/10.5465/amp.2022.0233>
6. Burns, J., & Scapens, R. W. (2000). Conceptualizing management accounting change: An institutional framework. *Management Accounting Research*, 11(1), 3-25. <https://doi.org/10.1006/mare.1999.0119>
7. Chapman, C. S. (2018). Interpretive methodological expertise and editorial board composition. *Critical Perspectives on Accounting*, 51, 47-51. <https://doi.org/10.1016/j.cpa.2017.10.007>
8. Chenhall, R. H. (2003). Management control systems design within its organizational context: findings from contingency-based research and directions for the future. *Accounting, organizations and society*, 28(2-3), 127-168. [https://doi.org/10.1016/S0361-3682\(01\)00027-7](https://doi.org/10.1016/S0361-3682(01)00027-7)
9. Crauser, J.-P., Harvatopoulos, Y., & Sarnin, P. (1989). *Practical guide to data analysis*. Éditions d'Organisation.

10. El Ansari, Y. (2021). L'évolution des nouvelles formes de travail dans les entreprises marocaines après l'application du nouveau code du travail: Analyse statistique des tendances entre 2009 et 2015 [The evolution of new forms of work in Moroccan companies following the application of the new labor code: Statistical analysis of trends between 2009 and 2015]. *African Scientific Journal*, 3(4), 581-602. <https://hal.science/hal-03723860>
11. Evrard, Y., Pras, B., & Roux, E. (2003). *Market: Studies and research in marketing* (3rd ed.). Dunod. Retrieved from https://cataloguecentre.neoma-bs.fr/index.php?lvl=notice_display&id=19447
12. Ferreira, A., & Otley, D. (2009). The design and use of performance management systems: An extended framework for analysis. *Management Accounting Research*, 20(4), 263-282. <https://doi.org/10.1016/j.mar.2009.07.003>
13. Foss, N. J., & Saebi, T. (2018). Business models and business model innovation: Between wicked and paradigmatic problems. *Long Range Planning*, 51(1), 9-21. <https://doi.org/10.1016/j.lrp.2017.07.006>
14. Goretzki, L., & Messner, M. (2019). Backstage and frontstage interactions in management accountants' identity work. *Accounting, Organizations and Society*, 74, 1-20. <https://doi.org/10.1016/j.aos.2018.09.001>
15. Henri, J. F. (2006). Management control systems and strategy: A resource-based perspective. *Accounting, organizations and society*, 31(6), 529-558. <https://doi.org/10.1016/j.aos.2005.07.001>
16. Igalens, J., & Roussel, P. (1998). *Research methods in human resources management*. Economica. Retrieved from <https://gallica.bnf.fr/ark:/12148/bpt6k33326262.texteImage>
17. Khanagha, S., Volberda, H. W., Alexiou, A., & Annosi, M. C. (2022). Mitigating the dark side of agile teams: Peer pressure, leaders' control, and the innovative output of agile teams. *Journal of Product Innovation Management*, 39(3), 334-350. <https://doi.org/10.1111/jpim.12589>
18. Merchant, K. A., & White, L. F. (2017). Linking the ethics and management control literatures. In *Advances in Management Accounting* (vol. 28, pp. 1-29). Emerald Publishing Limited. <https://doi.org/10.1108/S1474-787120170000028001>
19. Otley, D. (2016). The contingency theory of management accounting and control: 1980–2014. *Management Accounting Research*, 31, 45-62. <https://doi.org/10.1016/j.mar.2016.02.001>
20. Pittenger, D. J. (2003). *Behavioral research: Design and analysis*. McGraw-Hill. Retrieved from https://books.google.co.uk/books/about/Behavioral_Research_Design_and_Analysis.html?id=xJE0uwEACAAJ&utm_source=gb-shareBehavioral
21. Rikhardsson, P., & Yigitbasioglu, O. (2018). Business intelligence & analytics in management accounting research: Status and future focus. *International Journal of Accounting Information Systems*, 29, 37-58. <https://doi.org/10.1016/j.accinf.2018.03.001>
22. Simons, R. (1994). *Levers of control: How managers use innovative control systems to drive strategic renewal*. Harvard Business Press. Retrieved from https://books.google.com.ua/books/about/Levers_of_Control.html?id=QLgfmAEACAAJ&redir_esc=y
23. Strauß, E., & Zecher, C. (2013). Management control systems: A review. *Journal of Management Control*, 23(4), 233-268. <https://doi.org/10.1007/s00187-012-0158-7>
24. Teece, D. J. (2018). Business models and dynamic capabilities. *Long Range Planning*, 51(1), 40-49. <https://doi.org/10.1016/j.lrp.2017.06.007>
25. Tessier, S., & Otley, D. (2012). A conceptual development of Simons' levers of control framework. *Management Accounting Research*, 23(3), 171-185. <https://doi.org/10.1016/j.mar.2012.04.003>