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RESEARCH ARTICLE

The Impact of ERP Systems on Management Control

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ABSTRACT

This article aims to address the relationship between the effectiveness of the management control function and the success of ERP systems. To do so, we first examined the theoretical foundations of this relationship by utilizing structuration theory, actor-network theory (ANT), and the sociomaterial approach. This section allowed us to demonstrate, on the one hand, the interdependencies observed between the deployment of an ERP system and its various consequences that may develop within the control function, and on the other hand, to describe the influence that management control can have on the choice of an ERP solution. Subsequently, we conducted an empirical study with the objective of testing the research hypotheses and the conceptual model based on the theoretical foundations. Using a questionnaire administered to a sample of 35 individuals with various profiles, working in Moroccan companies that use an ERP system, 14 responses were accepted and then processed using SPSS software.

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1. INTRODUCTION

Anthony, a prominent figure in management control, noted that "the way information is processed within the management control function is akin to an economic network with its users. The designers and operators of such a network strive to transmit messages quickly, reliably, and clearly, without needing to know the content of the messages" (Anthony et al., 1985).

With the rapid advancement of information technology over the past few decades, driven by an ever-changing business environment, Enterprise Resource Planning (ERP) systems have become increasingly popular. Initially adopted by large corporations, these systems are now widely used by small and medium-sized enterprises (Sánchez-Rodríguez & Spraakman, 2012). Before the introduction of ERP systems in the 1990s, different organizational functions operated independently using separate information systems (Rom & Rohde, 2007). However, the advent of ERPs marked a turning point for many companies, enabling them to enhance their performance and competitiveness (Dechow & Mouritsen, 2005; Arnold, 2006). ERPs are organization-wide integrated information systems designed to coordinate and control a company's assets, data, and operations from centralized data sources. By unifying business information into a single database, ERPs make various elements of the organization visible (Dechow & Mouritsen, 2005).

Management Control Systems (MCS) play a crucial role in overseeing strategic choices and guiding organizational practices to maximize the achievement of objectives, particularly in terms of

organizational performance (Bhimani et al., 2008). ERPs, in turn, provide significant support to management controllers by facilitating ongoing coordination and analysis of information. For ERPs to be effective, like any management information system, they must incorporate key components that enable management controllers to work more efficiently.

This study aims to explore the influence of ERPs on management control and their practical applications in this field.

In this context, the main research question is: To what extent do Enterprise Resource Planning systems influence the management control function within organizations?

Several sub-questions arise to address this question:

- What is the nature of the interaction between ERP systems and management control?
- Do ERPs alter management control practices?
- Does the integration of ERPs impact the roles of management controllers?
- Conversely, does management control influence the adoption of an ERP solution? Is this relationship unilateral or bilateral?

To explore these questions, we adopted a positivist approach combined with a hypothetico-deductive reasoning method, often associated with this paradigm. In line with this approach, this research employs a quantitative survey methodology. We begin by analyzing the theoretical foundations of the relationship between ERP systems and the management control function, followed by a quantitative study based on a four-part questionnaire distributed to various professionals working in Moroccan companies using ERPs. Out of 35 questionnaires sent, 14 responses were retained and analyzed using SPSS software. The final chapter will present and discuss the results of this study.

2. THEORETICAL FOUNDATIONS

The focus of this study requires a theoretical framework that addresses both the needs of management control and information systems (IS). This section aims to demonstrate, on one hand, the interdependencies observed between the deployment of an ERP system and its various consequences, particularly within the control function, and on the other hand, to describe the influence that management control can exert on the selection of an ERP solution. By analyzing various aspects of the theoretical literature, we will build these relationships.

To better understand the success of ERP systems within the management control function, we have combined structuration theory and actor-network theory (ANT). The theoretical framework created by integrating these two meta-theories is relatively recent and is influenced by the sociomaterial approach proposed by Orlikowski to update the theoretical content of IS research, drawing from ANT and structuration theory studies (Orlikowski, 2007, 2009).

2.1. Structuration theory

Structuration theory offers a perspective on the duality of structure, recognizing the interaction between meaning, norms and values, and power, and positing a dynamic relationship between these different facets of society. Giddens (1984) argues that just as an individual's autonomy is influenced by structure, structures are maintained and adapted through the exercise of agency. The interface where an actor encounters a structure is referred to as "structuration."

The theory assumes that social action cannot be fully explained by theories of structure or agency alone, acknowledging the context of rules produced by the social structure within which actors operate. Structures are reinforced only through conforming actions, implying that social structures have no inherent stability outside of human action because they are socially constructed. Alternatively, through reflexivity, agents can modify social structures by acting beyond the constraints imposed by these structures. Giddens identifies three types of structures in a social system:

1. **Meaning:** Where meaning is encoded in language and discourse practices.
2. **Legitimation:** Comprising normative perspectives embedded as societal norms and values.
3. **Domination:** The application of power, particularly in resource control.

The primary reason for employing structuration theory in this study is to assess whether it can explain the success of interactions between technology (ERP) and the management control function. Understanding this success requires considering not only the material aspect of technology but also its social dimension.

Theoretical concepts from structuration theory help us understand how the management control system contributes to the social structure of an organization. The incorporation of technology into an organization can be a strategy to increase influence over actors, related to Giddens' third structural element—domination. It can also foster the creation of meaning among actors, linked to the first structural element—signification, and ultimately develop a certain approach to organizational functioning concerning morality, based on the second structural element—legitimation. The formation and reproduction of power, sanctions, meaning, and morality within an organization can be significantly influenced by management control, just as they can be by technology. This viewpoint highlights that management control and technology can serve as sources of structuring the social order within a company (Giddens, 1984).

In this context, technology and management control systems, which integrate structural characteristics, significantly impact organizational activities, protocols, procedures, and management techniques. The integration of ERP technology into the management control function starts by mutually introducing the structural dimensions and properties of both the technology and the function el kezazy (2022). Beyond the key success factors necessary for this integration, it is also crucial to consider the alignment between the existing structural properties of the management control function and the new structural properties of the technology.

2.2. Actor-network theory (ANT)

Actor-Network Theory, developed in the 1980s by researchers from the Center for the Sociology of Innovation, including sociologists Michel Callon, Bruno Latour, and Madeleine Akrich, challenges traditional divisions and reconsiders scientific and human phenomena based on the multiplicity of relationships that constitute them. This approach rejects distinctions between the human and non-human, as well as the separation of nature and society. According to ANT, no distinction exists between social and technological elements; both must be considered symmetrically in relation to humans (Callon, 1986).

For ANT theorists, the world should not be understood in terms of social groups but as a network, where what constitutes the social is the association, the formation of collectives, and the mediations and relationships that combine them. This concept is inherently symmetrical, meaning that all elements—whether organizational, cognitive, or non-human entities—are of equal importance in analysis. From this perspective, the social is seen as the result of repeated interactions among diverse actors. In other words, within the actor-network, every actor is a network, and vice versa.

Any event involving the entire network affects all its elements, implying that no single source is responsible for an event. The action of one network component leads to changes in the network, engaging a series of entities and mobilizing the collective force they represent. The stability of an actor-network is continuously at risk of collapsing if any actors withdraw from the network.

According to ANT, an ERP system can be viewed as a set of interpretation and recording procedures that form a network of both human and non-human actors surrounding it. In this sense, ERP is considered a sociomaterial construct that requires the unification of a network of actors for successful integration. At the start of this integration process, the roles and responsibilities of each actor, both internal and external (such as management controllers, managers, and consultants), are defined. This phase of ERP project incorporation relates to the concept of "enrollment" from the sociology of translation (Callon, 1986), which involves defining and coordinating responsibilities and establishing a mechanism through which these responsibilities are allocated to actors who accept them (Callon, 1986).

Understanding the needs and requirements of management controllers is the main goal of the second phase of ERP deployment within the management control function. The introduction of new procedures, practices, techniques, and methodologies, such as ABM and ABC, may necessitate a

different structure for the management control function. At this stage, the steering committee works to establish a project plan that meets the informational needs of the relevant actors. This plan also aims to educate potential users about the disadvantages and advantages of the ERP system.

2.3. The Sociomaterial approach

The sociomaterial approach is based on the idea that human interaction and materiality are so intertwined that they cannot be studied separately. It is a perspective constructed at the intersection of technology, practice, and organization, with the principle that materiality constitutes the social world and vice versa. While materiality refers to the properties of technology, sociomateriality describes the enactment of specific practices that combine materiality with institutions, norms, discourses, cultures, and other phenomena that can be defined as "social" (Wagner et al., 2011).

Many experts use a sociomaterial perspective to examine how the material properties of an ERP system merge and evolve together with the social aspects in the post-integration period (Wagner et al., 2010). According to this view, an ERP system is a sociomaterial composition that can either enable or hinder an organization's ability to perform certain operations.

The reason for adopting the sociomaterial approach in this research is to study the interweaving of the material properties of ERP systems with the social aspects after ERP integration into the management control function el kezazy & hilmi (2022). In this perspective, the ERP system represents a sociomaterial ensemble, where misalignment between embedded practices and organizational practices necessitates sociomaterial reconfiguration.

To achieve technological stability, Wagner et al. (2010) examine post-implementation adjustments of the ERP system through the negotiation process between various stakeholders and practitioner groups. The fundamental principle of the sociomaterial approach is that the social and the material are jointly constituted and, therefore, inherently interdependent. Thus, the structures and processes of an ERP system, including the norms and practices associated with implementing best practices, are constantly evolving.

The procedures and standards for standard practices are not embedded in the information technologies (Wagner et al., 2010); rather, they emerge from the actual use of the system. These behaviors are produced by the interaction and intertwining of the social and material during the system's use and development process post-implementation. Additionally, based on a sociomaterial perception, even if the technological structure of this system is primarily designed to fit and quickly integrate into the firm's activities, researchers argue that management accounting cannot be seamlessly integrated into ERP structures (Wagner et al., 2011). They also highlight the role and mediating potential of practitioner groups, asserting that well-established accounting practices can be integrated into the ERP system. They argue that technology alone cannot influence practices, especially since the logic of management control—referred to as "old practices"—often conflicts with the logic of "best practices." Wagner et al. (2011) acknowledge that some companies may be unable to execute or manage projects and funds as effectively as they could under previous regimes due to the rigid structure of the ERP system.

2.4. Hypothesis development

Building on the theoretical concepts presented earlier, we have formulated four major hypotheses. The first hypothesis explores the influence of organizational factors (such as organizational structure, strategy, size, and culture) on the effectiveness of the management control function. The second hypothesis examines the relationship between organizational factors and the success of ERP systems. The third hypothesis addresses the connection between ERP system factors (including the type of system and its level of maturity) and its success. Finally, the fourth hypothesis aims to establish the link between the success of an ERP system and the effectiveness of the management control function. Based on these hypotheses, we also observe the presence of a mediating effect of ERP system success between the effectiveness of management control and both organizational factors and ERP factors.

2.4.1. Organizational factors and effectiveness of the management control function

A significant body of research addresses the links between management control systems (MCS) and contingency factors (Otley, 1999; Chenhall, 2007; AbdelKader & Luther, 2008). From these studies and the theoretical concepts discussed earlier, we identify four organizational factors to consider in this study: structure, strategy, size, and organizational culture. These factors may influence the effectiveness of the management control function el kezazy & hilmi (2023). Thus, we propose the following hypothesis: **H1**: There is a positive relationship between organizational factors and the effectiveness of the management control function.

2.4.2. Organizational factors and ERP system success:

Considering contingency theory, it is possible to enhance the quality of the missions of an information system (IS) implemented within an organization to better meet its needs (Myers et al., 1997). From the research and theoretical notions previously discussed, we deduce that organizational factors influence the success of ERP systems. Consequently, we propose the following hypothesis: **H2**: Organizational factors positively influence the success of ERP systems.

2.4.3. ERP factors and ERP system success

Numerous studies have demonstrated the importance of ERP system factors, particularly the type of ERP system and its level of maturity, and the role they play in the success of these systems. This relationship leads us to formulate the following hypothesis: **H3**: There is a positive correlation between ERP factors and the success of ERP systems.

2.4.4. ERP system success and effectiveness of the management control function

This statement represents the central hypothesis of this study, focusing on the relationship between the success of the ERP system and the effectiveness of the management control function. Morris (2011) argues that an organization can improve its management control systems (MCS) through the use of "built-in control" components and other features provided by ERP systems. According to this study, companies that have implemented ERP systems exhibit fewer material weaknesses in management control compared to those that have not. Additionally, an ERP system can act as a mediator, influencing the functionality and effectiveness of the management control function. Thus, the final hypothesis is formulated as follows: **H4**: The success of ERP systems is positively associated with the effectiveness of the management control function.

2.5. Conceptual model

In this section, we present a conceptual model that addresses the relationship between ERP systems and the effectiveness of the management control function within an organization. This model is based on contingency factors related to the effectiveness of management control and the success of ERP systems. The aim of this model is to support the theoretical foundations predicting ERP and management control interactions and to subsequently confirm them el kezazy & hilmi (2023).

The theoretical concepts derived from the previously discussed theories (structuration theory, Actor-Network Theory, and the sociomaterial approach) highlight organizational contingency factors, particularly organizational structure, strategy, and culture. Additionally, these theoretical concepts suggest ERP system success factors, including the type of ERP system used and its level of maturity, in addition to organizational factors.

Figure 1 presents the conceptual model:

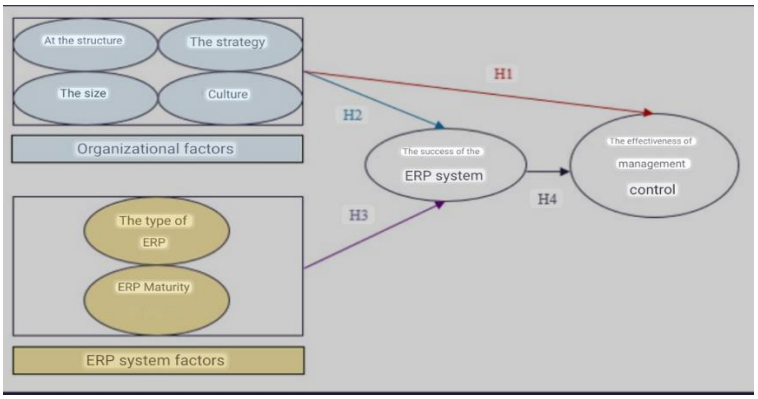

Figure 1: Conceptual model

Source: Created by the authors

The model above (Figure 1) illustrates that the premise concerning the effectiveness of the management control function is linked to the success of ERP systems as well as to contingency factors, including both organizational factors and ERP factors. We have considered four organizational factors: structure, strategy, size, and organizational culture, all of which are connected to both the success of ERP systems and the effectiveness of the management control function. On the other hand, two ERP factors have been considered: the type and level of maturity of the ERP system chosen by the organization. These factors are directly linked to the success of ERP integration and indirectly linked to the effectiveness of management control el kezazy & al (2024).

3. RESEARCH METHODOLOGY:

This chapter outlines the research methodology employed in this study. Divided into two parts, it first addresses data collection and sampling, including the epistemological stance, reasoning approach, research strategy, research method, as well as data selection and analysis. The second part discusses the development and measurement of the questionnaire.

3.1. Data collection and sampling:

3.1.1. Epistemological stance

To select appropriate research strategies and procedures, it is essential to consider the epistemological position of the study. For several reasons, this study follows the positivist paradigm: first, this paradigm allows the use of theories to achieve the study's objectives and to formulate hypotheses. Second, the positivist paradigm is well-suited to the objectives of this study, which aims to develop a theoretical framework for the relationship between ERPs and the management control function. Third, Ryan et al. (2002) and Abdel-Kader (2011) explain that the positivist paradigm is widely used, particularly in the field of management accounting E. K. Hamza & al (2024).

3.1.2. Reasoning approach

Regarding reasoning approaches, we distinguish between deductive, inductive, and abductive logic. This study employs a hypothetico-deductive logic, beginning with certain general laws and universal theories to subsequently build research hypotheses, which are confirmed or refuted based on a conceptual model. Data is then collected and analyzed to test the hypotheses and the conceptual model. Furthermore, the application of deductive reasoning is often associated with positivism to develop an explanatory theory for understanding social issues.

3.1.3. Research strategy

The choice of research strategy (qualitative or quantitative) primarily depends on the research objective, data, and field, and it must align with the chosen epistemological stance and reasoning approach. In this context, the quantitative approach is frequently hypothetico-deductive and preferred by positivists. Moreover, as the aim is to measure the extent of a phenomenon (the interactions between the management control function and ERP systems) and explain it by studying

explanatory variables (organizational factors, ERP system factors, ERP system success), this research is based on a quantitative approach.

3.1.4. Research method

After identifying the paradigm, reasoning approach, and research strategy, it is necessary to define the research method used to study the issue. Research methods include meta-analysis, experimental method, quantitative survey, qualitative survey, case study method, ethnographic method, etc. The experimental method and surveys are commonly associated with the positivist paradigm and deductive logic. On the other hand, the ethnographic method is frequently linked to the interpretivist paradigm and inductive logic. However, a research method can sometimes be associated with multiple paradigms (Collis & Hussey, 2009). In this regard, in line with the chosen paradigm and reasoning approach, this research adopts the quantitative survey method (questionnaire).

3.1.5. Sampling and data analysis

The questionnaire method allowed us to collect open-ended quantitative primary data to test the research hypotheses and generalize the results. We selected Moroccan publicly listed companies that use an ERP solution as the target population and then used a simple random probabilistic sampling method to determine the sample. The questionnaire was administered via a Google Forms link through email to a sample of 35 individuals from various profiles (management controller, general manager, financial director, IT manager, ERP consultant) working in Moroccan companies across various sectors (agriculture and agri-food, infrastructure and industry, lifestyle and health, cleantech, tech, and services).

Table 1 summarizes the response rate calculation:

Table 1: Response rate

Responses	Total
Usable responses	14
Companies without ERP	3
Incomplete responses	2
No response	16
Total questionnaires sent	35
Response rate	40%

Source: Created by the authors

We received responses from 19 individuals, of which 14 responses were accepted, resulting in a response rate of 40%. The collected data was then processed using SPSS version 25, and analyzed through linear regression. This method helped us understand the relationships between explanatory variables and the dependent variables, and determine the degree of correlation between them.

3.2. Questionnaire development and measurement

The questionnaire used for this study consists of 12 pages (including the cover page) and is divided into four parts: evaluation of the management control function, evaluation of the ERP system, variables under study, and finally, the demographic section. The questions were developed based on the hypotheses and the conceptual model.

3.2.1. Evaluation of the management control function

The section concerning the evaluation of the management control function contains a single closed-ended question, asking participants to indicate their level of agreement or disagreement with 10 statements. For this question, we used a 7-point Likert scale ranging from "strongly disagree" to "strongly agree" to provide participants with more options and ensure more specific responses.

3.2.2. Evaluation of the ERP system

The section concerning the evaluation of the ERP system also contains a single closed-ended question, asking participants to indicate their level of agreement or disagreement with 12

statements. For this question, we similarly used a 7-point Likert scale ranging from "strongly disagree" to "strongly agree."

3.2.3. Variables under study

This section contains six questions, four of which focus on organizational factors (organizational structure, organizational strategy, organizational size, organizational culture), and two on ERP system factors (the type of ERP system and its level of maturity). In this section, we included closed-ended questions with a 7-point Likert scale, as well as some categorical questions (e.g., ERP system type) with 4 to 5 response options (including an "other" option).

3.2.4. Demographic section

This section contains three categorical questions with six response options each. These questions concern the participant's profile, with key options including management controller, general manager, financial director, IT ger, and ERP consultant, with the possibility to choose the "other" option. Additionally, two questions pertain to the companies, focusing on their legal forms and sectors of activity.

4. Presentation of study results and discussion

4.1. Linear regression: management control effectiveness – organizational factors

4.1.1. Reliability:

The purpose of this section is to verify the temporal stability of the scale used in the factor analysis and to also check whether it accurately measures the identified construct. We begin with an internal consistency analysis for two components: management control effectiveness, which includes 10 items, followed by an analysis of the organizational factors, which consist of 11 items.

The tables below represent the most important tables from this analysis, particularly those concerning Cronbach's alpha index. Table No. 2 pertains to the first component (management control effectiveness):

Table 2: Reliability statistics (management control effectiveness)

Cronbach's Alpha	Number of Items
0.729	10
Source: SPSS	

The alpha for the items measuring management control effectiveness is 0.729, which is above the accepted threshold of 0.60. Therefore, the scale demonstrates good internal consistency, and all items were retained for further analysis.

Table No. 3 pertains to the organizational factors variable. In this analysis, 10 items were considered, and 1 item was excluded as it was a string item:

Table 3: Reliability statistics (organizational factors)

Cronbach's Alpha	Number of Items
0.742	10
Source: SPSS	

The alpha for the organizational factors is 0.742, which is above the accepted threshold of 0.60. Therefore, the scale demonstrates good internal consistency, and the 10 numeric items were retained for further analysis.

4.1.2. Regression interpretation

In this section, we aim to determine whether the independent variable "organizational factors" can explain the dependent variable "management control effectiveness," implying a simple linear regression.

To do this, we first introduced two new variables: one named "management control effectiveness," calculated as the average of its 10 items, and another named "organizational factors," also calculated as the average of its 10 numeric items (excluding the string item).

Table No. 4 provides a summary of the models, allowing us to assess if the data is well-suited to the regression model:

Table 4: Model summary

Model		R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.845a	.714	.646	.69482	.714	1.625	1	12	.000	2.040
*a. Predictors: (Constant), Organizational Factors										
b. Dependent Variable: managementcontroleffectiveness										
Source: SPSS*										

The correlation coefficient R = 0.845 suggests that the independent variable "organizational factors" and the dependent variable "management control effectiveness" are correlated and that the data fits the regression model well. With $R^2 = 0.714$, we can state that organizational factors can explain 71% of the variation in the effectiveness of the management control function.

Table No. 5 assesses the accuracy of the regression model by testing the null hypothesis, which posits that the dependent and independent variables are not related:

Table 5: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	**Regression**	.455	1	.038	1.625	.000b
	Residual	.062	12	.062		
	Total	.517	13			
*a. Dependent Variable: management contrôl effectiveness						
b. Predictors: (Constant), Organizational Factors						
Source: SPSS*						

The F-value test is the ultimate method to test the model's relevance. The sum of squares for the regression equals 0.455, while the residual sum of squares equals 0.062. We observe that the regression sum of squares is greater than the residual sum, indicating the relevance of the regression model. The F-value = 1.625 is significant at $p < 0.0005$, suggesting that the likelihood of obtaining such an F-value by chance is less than 0.05%. Consequently, it appears that the dependent and independent variables are statistically related, leading us to reject the null hypothesis that the dependent and independent variables are not related.

Table No. 6 presents the Beta values:

Table 6: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	**(Constant)**	4.724	.991		4.767	.000		
	Organizational Factors	.830	.080	.845	1.275	.000	1.000	1.000
*a. Dependent Variable: managementcontroleffectiveness								
	Source: SPSS*							

The standardized Beta coefficient is 0.845, indicating that the variables are positively related and that the regression model fits the data well. Furthermore, Table No. 6 shows that the probability of obtaining a T-value of 1.275, assuming the intercept is 0, is less than 0.05%. We can conclude that organizational factors significantly contribute to predicting the effectiveness of the management control function.

This section allowed us to test H1, which posits that there is a positive relationship between organizational factors and the effectiveness of the management control function. Based on the previous analysis, we can say that H1 is confirmed.

Thus, we can deduce that organizational factors (structure, strategy, size, and organizational culture) can influence management control effectiveness, consistent with the theoretical concepts mentioned earlier. (Otley, 1999, Chenhall, 2007, AbdelKader & Luther, 2008)

4.2. Linear regression: ERP system success – organizational factors

4.2.1. Reliability

The purpose of this section is to verify the temporal stability of the scale used in the factor analysis and to check whether it accurately measures the identified construct. We begin with an internal consistency analysis for the variable "ERP success," which contains 12 items.

Table No. 7 represents Cronbach's alpha index:

Table 7: Reliability statistics

Cronbach's Alpha	Number of Items
.683	12

Source: SPSS

The alpha for the items measuring ERP system success is 0.683, which is above the accepted threshold of 0.60. Therefore, the scale demonstrates good internal consistency, and all items were retained for further analysis.

4.2.2. Regression interpretation

In this section, we aim to determine whether the independent variable "organizational factors" can explain the dependent variable "ERP success," implying a simple linear regression. To do this, we introduced a new variable, named "ERP success," calculated as the average of its 12 items.

Table No. 8 provides a summary of the models, allowing us to assess if the data is well-suited to the regression model:

Table 8: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.708a	.501	.419	.28857	.501	1.254	1	12	.000	2.238
*a. Predictors: (Constant), Organizational Factors										
b. Dependent Variable: ERPsuccess										
Source: SPSS*										

The correlation coefficient R = 0.708 suggests that the independent variable "organizational factors" and the dependent variable "ERP success" are correlated and that the data fits the regression model well. With $R^2 = 0.501$, we can state that organizational factors can explain 50% of the variation in ERP system success.

Table No. 9 assesses the accuracy of the regression model by testing the null hypothesis, which posits that the dependent and independent variables are not related:

Table 9: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.999	1	.083	1.254	.000b
	Residual	.104	12	.104		
	Total	1.104	13			

*a. Dependent Variable: ERPsuccess
b. Predictors: (Constant), Organizational Factors
Source: SPSS*

The F-value test is the ultimate method to test the model's relevance. The sum of squares for the regression equals 0.999, while the residual sum of squares equals 0.104. We observe that the regression sum of squares is greater than the residual sum, indicating the relevance of the regression model. The F-value = 1.254 is significant at $p < 0.0005$, suggesting that the likelihood of obtaining such an F-value by chance is less than 0.05%. Consequently, it appears that the dependent and independent variables are statistically related, leading us to reject the null hypothesis that the dependent and independent variables are not related.

Table No. 10 presents the Beta values:

Table 10: Coefficients

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**	**Collinearity Statistics**	
		B	**Std. Error**	**Beta**			**Tolerance**	**VIF**
1	**(Constant)**	7,564	1,468		5,153	,000		
	Organizational Factors	,799	,167	,808	1,120	,000	1,000	1,000
*a. Dependent Variable: ERP Success								
	Source: SPSS*							

The standardized Beta coefficient is 0.808, indicating that the variables are positively related and that the regression model fits the data well. From Table No. 10, we observe that the probability of obtaining a T-value of 1.120, assuming the intercept is 0, is less than 0.05%. Therefore, we can conclude that organizational factors significantly contribute to predicting the success of ERP systems.

This section allowed us to test H2, which posits that organizational factors positively influence the success of ERP systems. Based on the previous analysis, we can say that H2 is confirmed.

In this section, we examined the contingent relationships between the four organizational factors and the success of ERP systems. Considering contingency theory, we can enhance the quality of the IS missions implemented within an organization to better meet its needs (Myers, et al., 1997). Thus, we can deduce from the study conducted and the theoretical concepts previously mentioned that organizational factors influence the success of ERP systems.

4.3. Linear regression: ERP system success – ERP system factors:

This section aims to help us understand the relationship between the independent variable "ERP system factors," which includes 2 items: the type of ERP system and the ERP system's maturity level, and the dependent variable "ERP system success," which includes 12 items.

Figure No. 2 presents the percentages of ERP system types implemented within the participating companies:

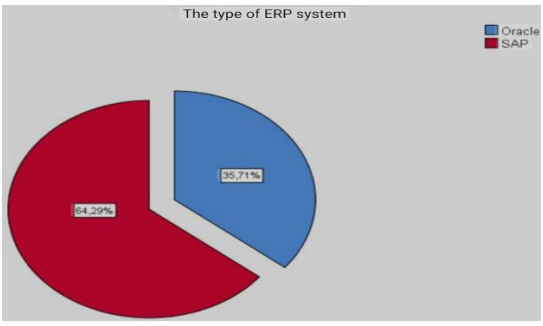

Figure 2: ERP system type

Source: SPSS

In the questionnaire, multiple options were provided to participants for this question. However, the results show that 35.71% of companies use the Oracle solution, while 64.29% use the SAP solution, with 0% using the other proposed solutions.

Figure No. 3 presents the maturity level of the ERP solution implemented within the participating companies:

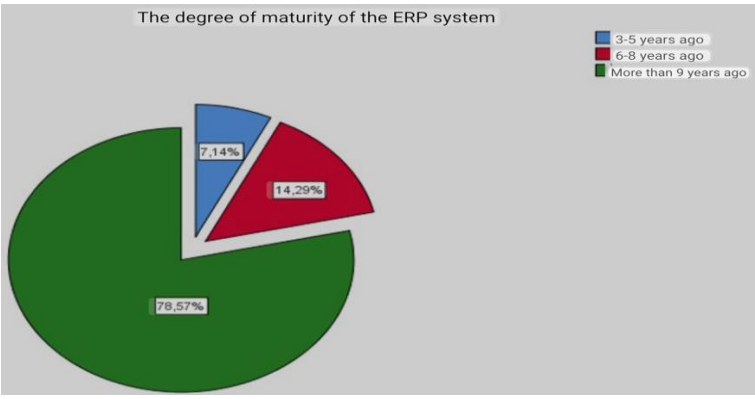

Figure 3: ERP system maturity level

Source: SPSS

The results show that 78.57% of companies introduced their ERP solution more than 9 years ago, 14.29% introduced it 6-8 years ago, and 7.14% implemented it 3-5 years ago. This indicates that ERP solutions have not been introduced recently in Moroccan companies.

Furthermore, we were unable to perform a linear regression analysis in SPSS due to the difference in the nature of the items in the two variables; the items for the "ERP success" variable are numerical, while the items for the "ERP factors" variable are string-based. Therefore, H3, which posits that there is a positive correlation between ERP factors and ERP system success, is rejected. However, several research studies have demonstrated the importance of ERP system factors, particularly the type of ERP system and its maturity level, and the role they play in the success of these systems (Holland & Light, 2001; Hayes et al., 2001; Wang et al., 2011).

4.4. Linear regression: effectiveness of management control function - ERP system success

In this section, we aim to determine whether the independent variable "ERP success" can explain the dependent variable "management control effectiveness." In this case, we are discussing a simple linear regression.

Table No. 11 provides a summary of the models, which will allow us to determine whether the data is suitable for the regression model:

Table 11: Model summary

Model	R	R-Square	Adjusted R-Square	Standard Error of the Estimate	Change Statistics					Durbin-Watson
					R-Square Change	F-Change	ddl1	ddl2	Sig. F-Change	
1	,801 a	,641	,672	,20654	,641	,123	1	12	,000	1,980
a. Prédicteurs : (Constante), succèsERP										
b. Variable dépendante : efficaciteduCG										

Source: SPSS

The correlation coefficient R = 0.801 suggests that the independent variable "ERP success" and the dependent variable "management control effectiveness" are correlated, and that the data is well-suited for the regression model. Additionally, with R^2 = 0.641, we can say that the success of ERP systems can explain 64% of the variation in the effectiveness of the management control function.

Table No. 12 evaluates the accuracy of the regression model. To this end, we test the null hypothesis that the dependent and independent variables are not related.

Table 12: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,512	1	,043	1,123	,000[b]
	Residual	,005	12	,005		
	Total	,517	13			

a. Dependent Variable: management control effectiveness
b. Predictors: (Constant), ERP success
Source: SPSS

The F-value test is the ultimate method for testing the relevance of the model. In this regard, the sum of squares for the regression equals 0.512, while the sum of squares for the residuals equals 0.005. We observe that the sum of squares for the regression is greater than that for the residuals, allowing us to conclude that the regression model is relevant. The F-value = 1.123 is significant at $p < 0.0005$, indicating that the probability of obtaining such an F-value by chance is less than 0.05%. Therefore, it appears that the dependent and independent variables are statistically related, leading us to reject the null hypothesis that the dependent and independent variables are not related.

Table No. 13 presents the Beta values:

Table 13: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	5.577	1.166		4.784	,000		
	ERP success	,669	,197	,701	1,351	,000	1,000	1,000

a. Dependent Variable: management control effectiveness
Source: SPSS

The standardized Beta coefficient is equal to 0.701, indicating that the variables are positively related, and that the regression model is well-suited to the data. Additionally, from **Table No. 13**, we observe that the probability of obtaining a T-value equal to 1.351, assuming the intercept is equal to 0, is less than 0.05%. Thus, we can conclude that the success of the ERP system significantly contributes to predicting the effectiveness of the management control function.

This section allowed us to test H4, which states that the success of ERP systems would be positively associated with the effectiveness of the management control function. Based on the previous analysis, we can say that H4 is confirmed, consistent with the theoretical concepts discussed earlier. According to Morris (2011), an organization can improve its MCS through the use of components and features provided by ERP systems. According to this study, companies that have implemented ERP systems experience fewer material defects related to management control than those that have not Hilmi (2024).

CONCLUSION

This article aims to provide an overview of ERP and its applications in management control. To do so, we explored the relationship between the effectiveness of the management control function and

the success of ERP systems. First, we examined the theoretical foundations of this relationship. Through the analysis of various aspects of the theoretical literature, we incorporated structuration theory, actor-network theory (ANT), and the sociomaterial approach. Subsequently, an empirical study was conducted with a sample of 35 diverse profiles working in Moroccan companies that use an ERP system. Fourteen responses were accepted and then processed and analyzed using SPSS software. The results of this analysis showed that there is a positive relationship between organizational factors and the effectiveness of the management control function. Furthermore, organizational factors positively influence the success of ERP systems, which, in turn, is positively associated with the effectiveness of the management control function. However, no relationship between ERP factors and the success of ERP systems was confirmed.

This study presents several scientific and managerial implications. On the one hand, we used the questionnaire method to collect data, in contrast to many other studies that use interviews. Additionally, most previous research has used a single criterion to evaluate management control systems. In this study, we gathered a set of organizational factors to explain how these factors affect the effectiveness of the management control function. By examining the impact of two categories of factors (organizational factors and ERP factors) on ERP system performance, this study enriches the body of knowledge in the field of information systems (IS).

This study also has implications for managers regarding the deployment of an effective ERP system and its impact on management control. The study results can help managers recognize and understand the practices of other companies and provide recommendations to companies that do not have an ERP system or are planning to install one. The study also shows managers the extent of certain organizational and ERP factors on the effectiveness of their organization's management control.

However, we can identify several limitations that call for further debate and offer opportunities for future research directions. The first limitation is that we studied the relationships of organizational factors on one side and ERP factors on the other side in general terms with other variables, rather than studying these relationships factor by factor. This is due to the complexity of the model if we consider the factors individually. Additionally, we were unable to introduce and characterize all the organizational factors that may affect the study. Therefore, the impact of certain external factors (such as environmental uncertainty, competitiveness, etc.) on the effectiveness of management control and the success of ERP systems can be considered in future research.

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