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Research paper

The Use of the ERP Systems: What Impact on Management Control Performance?

Hala Bennani[1]*, Mohamed Achraf Nafzaoui[1]

[1]Research laboratory in sciences of organization management, ENCG, Ibn tofail University, Kénitra, Morocco.
**Corresponding author E-mail: halabennani1994@gmail.com*

Abstract

Due to the huge advances in the digital world, companies have witnessed a rapid growth in their information systems. Management control, which constitutes a key element of permanent pilotage to many executives, who rely on accounting records, was thoroughly influenced by the adoption of Enterprise Resource Planning (ERP).
Much research was done on the impact of information systems on management control and have illustrated that these systems and mainly ERP systems contribute to the evolution of management control.
Our main aim in this work has many folds. First, we would like to set forth the main literature reviews on ERP systems and management control in order to clarify the conceptual changes of these terminologies, then deal with the relation that exist between them, by collecting theoretical assertions as well as empirical evidence.
This paper in fact aims to shed light on the real impact of ERP systems on management control performance.

Keywords: *ERP systems; information system; management control; performance.*

1. Introduction

In the 90's, companies enormously evolved with the development of the enterprise resource planning. ERP systems are "software packages composed of several modules, providing cross-organization integration of transaction based data, throughout embedded business processes. These software packages can be customized to the specific needs of each organization up to certain limits" (Esteves et al. 1999).
Regarding the ERP impact on management control, it seems to some authors that ERP systems are a fantastic tool for management control system. However, numerous studies assert that there is no apparent relationship between information systems and the management control function.
The purpose of this study is to present a literature review of the ERP systems impact on management control performance; first, we will expose the conceptual evolutions of ERP systems and management control. Then, we will focus on the relationship between these concepts, by presenting theoretical assertions and some recent empirical studies.

2. Literature review

2.1. Enterprise Resource Planning

In fact, organizations used to work with a multitude of computer tools acting in parallel, and involving a duplication of many information. As the size of companies became more and more important, the architecture of information systems became even more complex and did not allow the company to function optimally. Moreover, the number of business units has steadily increased, and has been the source of errors, inefficiency and slowness. Companies seeking productivity gains and complete systems were therefore in demand for new IT tools.
Throughout the 1980s and 1990s, IT software solution publishers were developing integrated software packages, in which multiple functional applications, shared a common database (ERP). The main objective of this innovation was to address the various problems that organizations faced.
Historically, The Materials Requirements Planning (MRP) is the first management software. Orlicky (1975) designed the first generation of MRP systems, their main role is to plan production needs, centrally through production management. The MRP is a modular software package dealing with short-term planning problems in production.
In the 1979, MRP technology was expanded to create a new approach called manufacturing resources planning (MRP II). This new system added medium-term concerns to MRP by providing a broader view of material and human management.

From 1990, the logic introduced by MRP gradually extended to all the company functions, eventually leading to the "ERP"; a coherent system allowing the integration of all the functions of organization and a standardization around a common language [3]. The ERP has therefore emerged as the embodied form of MRP and MRP II systems with multiple benefits.
The ERP systems have improved the flow of data and consequently the company's performance. By 1998, approximately 40% of companies with annual revenues of more than $1 billion had implemented ERP systems [4]. In addition, the worldwide license and maintenance revenue for ERP systems was US$21.5 billion in 2000, which represented a growth of 13.1% from the 1999 market value of $US19 billion [5].
In order to explain the ERP's concept, we will cite several definitions from the published literature: Back in the early 2000s, ERP was defined as an enterprise-wide software package that combines business processes into a single shared database [6]. It has also been described as a complete set that integrates business functions using a shared information flow [7].
In 2001, O'leary defined ERP as "computer-based systems designed to process an organization's transactions and facilitate integrated and real-time planning, production, and customer response" [8]. Evenly, the American Production and Inventory Control Society has defined it as "a method for the effective planning and controlling of all the resources needed to take, make, ship and account for customer orders in a manufacturing, distribution or service company" [9].
For Giard [10], ERP systems are integrated software that aim to manage efficiently all of the company's resources. They propose a modular architecture allowing composing a customized system, relying on a relational database and a base of process adaptable to the specificities of the country and the company.
As for Reix [11], he defined ERP as a configurable, modular and integrated computer application, which aims to federate and optimize business management processes, by proposing a unique repository and relying on standard management rules. This definition emphasizes the standard character of this software package.
In addition, according to Jones [12], the term ERP refers to the software infrastructure that not only ensures internal cohesion throughout the enterprise but also supports the external business processes in which the enterprise participates.
Su and Yang defined ERP as "an integrated enterprise computing system that is designed to automate the flow of material, information, and financial resources among all functions within an enterprise on a common database" [13].
As for the recent definitions, Almajali stipulate that: "ERP provides an integrated and continuously updated view of core business processes using common databases maintained by a database management system. ERP systems track business resources cash, raw materials, production capacity and the status of business commitments: orders, purchase orders and payroll. The applications that make up the system share data across various departments (manufacturing, purchasing, sales, accounting, etc.) that provide the data"[14].

2.2. Management control

Over the past ten years, the management control function has been the subject of many scientific contributions. The main aim was to describe and clarify the exercise conditions and impacts of this function [15].
Anthony, founding father of management control discipline, defined it as "the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives" [16]. This definition is part of a limited framework referring to the accounting and financial aspect. It limits the management control in an act of post-evaluation by using terms efficiency and effectiveness that refer to the concept of result. In addition, it excludes the role of management control in the development of objectives because it assumes the prior existence of these. On the other hand, it highlighted the fact that management control is exercised by managers and not only by management controllers.
In 1970, Mockler added new concepts to Anthony's definition, he defined management control as "a systematic effort by business management to compare performance to predetermined standards, plans, or objectives in order to determine whether performance is in line with these standards and presumably in order to take any remedial action required to see that human and other corporate resources are being used in the most effective and efficient way possible in achieving corporate objectives" [17]. Moreover, Lowe has stipulated that: "The purpose of unified management control system is to ensure that actions are in accordance with the firm's plans to achieve its objectives" [18].
Several academic disciplines contribute on the practice of management control, such as accounting, economics, and social psychology (organizational behavior). According to Maciariello and Kirby "management control is concerned with coordination, resource allocation, motivation, and performance measurement" [19].
Simons presented a more comprehensive definition of management control: "Management control systems are the formal, information-based routines and procedures managers use to maintain or alter patterns in organizational activities" [20]. While Chenhall [21] views management control as the systematic use of management accounting and other control systems to achieve a specific goal.
Boisselier asserts "Management control looking to conceive and develop information tools designed to allow leaders to act, making the global economic coherence between objectives, means and achievements. It should be considered as a useful information system for Pilotage Company, because it controls the effectiveness and efficiency actions and the means to achieve objectives" [22].
Recently, Anthony and Govindarajan have defined otherwise this concept: "management control systems are tools to aid management for steering an organization toward its strategic objectives and competitive advantage. Management controls are only one of the tools that managers use in implementing desired strategies. However strategies get implemented through management controls, organizational structure, human resources management and culture" [23].

3. ERP systems' impact on management control performance

3.1. Theoretical background

Many articles focused on the impact of information systems, mainly ERP systems on management control performance. The evaluation of this performance depends on the tools, results and practices of the management control function.
The information system is a fundamental component of management control. It is providing a precise description of a past evolution, revealing gaps and explaining their causes in order to smooth the decision-making. It also ensures the understanding and implementation of different applications between workstations and functions [24]. While, Arnold asserts that: "The link between the ERP system and a management control system appears important as the benefits of an integrated system allows easy and fast access to information and

conveys the information in a relevant and usable form » [25]. The ERP implementation influences the management control systems, both formally and informally [26].
As stated by Autissier [27], ERP systems provide valuable assistance to the management controller in order to accomplish his mission. They offer unique and shared databases, allowing the controller to ensure information consistency. They also detect gap sources and eventually correct them thanks to the information traceability.
Hayes, Hunton and Reck [28] found that the firm performance of ERP adopters is significantly better when compared to non-adopters. Booth, Matolscy and Wieder concluded from their results that "ERP users report high levels of information integration; perform better in transaction processing and ad hoc decision-support than in sophisticated decision-support and reporting"[29].
According to Scapens and Jazayeri [30], ERP systems contribute to the management control performance by:
1. Eliminating routine stains;
2. Transferring accounting knowledge to managers;
3. Using more advanced indicators;
4. Expanding management controller's role.
Consequently, the ERP implementations improve decision-making, increase data quality, and enhance automation through a high number of auto generations [31].
Therefore, Hyvönen [32] has stipulated that there is no link between the implementation of ERP systems and conceptual innovations in management control (ABC approach, target costing, life-cycle costing, balanced scorecard and beyond budgeting...). However, in some ERP systems there is practically no such functionality or coding structure to build management control tools conveniently into the system [33]. The result must be checked carefully, because ERP systems may eliminate the unreliable and incomplete information [34].
The establishment of ERP systems is often an opportunity to redefine the missions and functions of the staff. As a result, the management controllers would become internal auditors and management consultants [35] and the need for qualified management controllers will be significantly reduced [36]. Their job became more about analysing, thanks to the accurate information provided by the ERP systems, giving the opportunity for more reliable, precise, and valuable decision making [37].
Contrary to the expectations, Granlund and Malmi [38] have asserted that ERP systems do not have many impacts on management control practices. This moderate impact is due to three reasons:
1. The implementation of ERP will allow induced effects to emerge slowly;
2. The complexity of ERP can hide some innovative aspects of management control development;
3. ERP systems can play a stabilizing role, reinforcing the existing management control practices.

3.2. Empirical results

In order to explore the interaction of ERP systems and management control performance and enlarge the scope of the existing research regarding interdependence between those variables, the table below summarizes research approaches and results of some recent empirical studies. (TABLE 1)

Table 1: Some recent empirical studies: ERP systems' impact on management control

Authors	Research approaches	Results
Meysonnier and Pourtier [39]	The research approach was based on ten case studies, in an intermediate method between qualitative field studies and questionnaire answer analysis.	- The implementation of the ERP does not play a decisive role in the evolution of management control function; -The ERP systems are an active support for management control, but require further modifications or additional developments; - The impact of the ERP systems on management control depends on contingency factors such as the size of the organization, the organizational structure, the managerial objectives, the stability of the "business" processes, and especially the organizational arrangements for implementing and supporting projects
Chtioui and Bennani [40]	The empirical study was based on qualitative approach (semi-structured interviews). It was conducted on four companies (Airports of Paris, France Telecom, Pechiney and L'Oréal).	-Thanks to ERP systems, the management control function has been emerged from routine tasks towards analysis, council and reporting; - The ERP systems have enabled management control to improve productivity through better budget tracking and synthesis, as well as refinement of available information; - The ERP systems have reduced the dependence on management controllers in the exploitation of management information; - The establishment of ERP has spawned conflicts between management control levels.
Zentar, Louitri and Naro [41]	The study was done on a family SME (Ménara prefa) by an exploratory research based on a qualitative approach materialized by semi-structured individual interview guides.	- The ERP systems are an asset for the management controller, particularly in his role as an advisor : they help steer decision-making in the right direction and offer the best indicators to react in a timely manner; - The ERP packages have made management control more efficient : they eliminate repetitive processes and greatly reduce the need to manually upload information. The systems also streamline business processes and make it easier and more efficient for companies to collect data.
Pussa and Mourouka [42]	The empirical material was collected via semi-structured interviews with the CFO and the controller of the case company, Alco Hellas S.A.	- The ERP packages are crucial for monitoring, evaluation and reporting; - The ERP systems play at least a supportive role in the implementation of management control; - Some of the management control techniques are not integrated in or supported by the ERP but are rather processed in a separate system.

4. Conclusion

This work presents a new form of ERP systems impact on management control performance presentation –as far as we know-, based on previous studies, by exposing the conceptual evolutions of ERP systems and management control and by collecting theoretical assertions and empirical results.
The literature on management control in the ERP environment highlights a weak influence of information integration on concepts and tools, while having a significant impact on the management control practices.
On the other hand, the empirical evidence collected, confirmed that ERP systems provide valuable assistance to the management controller. These packages open new perspectives for management control function with an increased focus on analysis, council and reporting at the expense of more routine tasks. However, they establish new boundaries for management controllers by causing conflicts between the central and operational levels, promoting a centralization of responsibilities and tasks and causing a loss in the quality of the information collected.
Finally, further work should include more company types. However, contributions of old and new data collection methods, such as survey questionnaires, can be employed to draw a larger number of results.

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