

## Influence of SME characteristics on the implementation of ERP

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### ABSTRACT

The ERP market has recently experienced a significant evolution in recent years, both in large companies and in small and medium-sized enterprises (SMEs). Compared to large companies, SMEs are distinguished by specific characteristics that can influence the implementation of the ERP system in these organizations. The purpose of this study is to analyse how these characteristics can determine the success or the failure of ERP implementation in SMEs. First, a set of characteristics, specific to SMEs has been identified from the relevant literature. Then, the influence of each characteristic on the different ERP lifecycle activities were studied. A multiple case study of four SMEs from different sectors was conducted. The data collection was carried out through 28 individual interviews with several stakeholders (users, external consultants, internal IT specialists and managers) in the four cases. The analysis of the interview data showed first that financial resources, Decision making and, the type of ownership of the company were identified as the most influential contextual factors. Then the two phases of the ERP life cycle "implementation" and "use and maintenance" were identified as being the most affected by the context of SMEs. The study results have significant implications for experts, managers and information.

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## 1. INTRODUCTION

The ERP represents today an interesting choice for the SME which aims a rationalization and a better integration of their information system. Even if the implementation of an ERP system remains a project considered as high risk, by its size, its cost, its strong potential implications. In this situation, some contexts can be identified as more favorable than others for an SME to adopt an ERP, whether it is the typical characteristics of the company, characteristics related to its IT profile, or related to its environment. The SME sector is the heart of the economy in Morocco. There are several definitions of SMEs, and this study adopts the definition proposed by the SME/SMI sub-commission, which initiated the 2000-2004 economic and social development plan (PDES). A definition that took into account several criteria such as:

- Less than 200 permanent employees,
- Less than 50 million dirhams of turnover,
- Total annual balance sheet below 40 million dirhams.

There are several aspects that differentiate SMEs from large companies and ERP studies also state that the results of large companies cannot be applied to SMEs [1-4]. There are unique characteristics that distinguish

SMEs from large companies, such as corporate structure and culture [5]. These characteristics are likely to determine how these organizations lead the implementation of the ERP system. Therefore, it is important to identify these characteristics and analyze how these differences can have an impact on the implementation of the ERP system in SMEs.

Several studies have examined the impact of organizational, environmental or technological factors on the implementation of the ERP system in SMEs [6-9], such as company size, CEO characteristics, type of industry, IT staff competency and resource availability. These studies provide conclusions about the influence of specific factors on the implementation of an ERP system. However, few studies have analysed the influence of the unique characteristics of SMEs on the factors studied. The purpose of this research is to analyse how the unique characteristics of SMEs can determine the success or failure of ERP implementation in SMEs. Thus, the research addresses the following research question: How does the SME context influence the implementation of the ERP system?

The following section summarizes the existing literature review on the influences of ERP implementation in SMEs and introduces an ERP lifecycle framework. Section 3 describes the research methodology applied in this study. In section 4 we analyse data from individual interviews with several stakeholders in all four cases. Then section 5 discusses the results in light of previous research and shows the contribution of the document. Finally, the last section presents the conclusions and implications of the study.

## 2. LITERATURE REVIEW

### 2.1. ERP system implementation in SMEs

The number of studies related to the implementation of ERP in SMEs has increased rapidly in recent years. SMEs use knowledge to manage their daily work. When an ERP system is adopted by SMEs, it tends to be simple. Most SMEs consider costs when considering an ERP system and are reluctant to invest after start-up. However, some SMEs take into account the changes that an ERP system can bring to their business, primarily those that seek future growth and development.

A study conducted by [5], examined the specific characteristics of SMEs and their main problems associated with knowledge management. Based on the work done by [10], the authors defined a list of characteristics of SMEs that can have an impact on the implementation of knowledge management. The characteristics have been classified into six groups: ownership and management, structure, culture and behavior, systems, processes and procedures, human resources, customs and the market. These studies provide an overview of the characteristics that distinguish SMEs from large firms. The reference [11] set an ERP life cycle framework, distinguishing six phases of the implementation process as shown in Figure 1. The phases of the ERP lifecycle consist of different stages that an ERP system traverses throughout its life within the organization. Based on the 4 cases studied, we will examine how each phase was influenced by the context of SMEs.

In the adoption decision phase, managers question the need for a new ERP system. This phase includes the definition of the system requirements, its objectives and benefits, as well as an analysis of the impact of the ERP system at the company and the organization level. The product that best fits the requirements of the organization is selected in the acquisition phase. A supplier is selected based on factors such as price, vendor location, maintenance services, and so on. The implementation phase: this phase involves customization or configuration, adaptation of the ERP software acquired according to the needs of the organization and the training of users. Typically, this task is performed by a vendor or consulting firm and can be performed via different implementation methods. The use and maintenance phase includes using the product in a manner that reflects the expected benefits and minimizes disruption. Once a system is implemented, it must be maintained because the anomalies must be corrected, optimization requests must be respected, and improvement of general systems must be made. The evolution phase consists of integrating additional applications in order to have a greater number of features in the ERP system. The retirement phase can be considered as the replacement phase of an ERP system by a new ERP system or another IS approach.

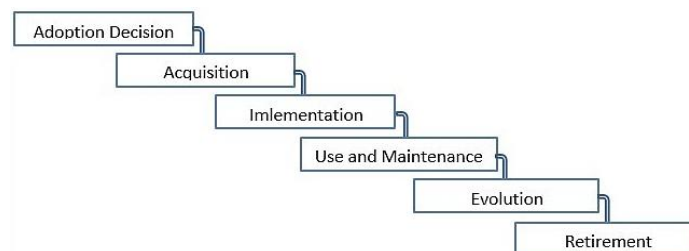


Figure 1. ERP life-cycle framework [11]

## 2.2. SME characteristics analysis

The literature review identified a set of SME characteristics has been identified that could potentially influence the implementation of ERP. These characteristics are grouped into four dimensions: economic/financial, organizational, environmental and technological. The diagram in Figure 2 shows the characteristics of SMEs, grouped by dimensions [5, 7-9, 12-14].

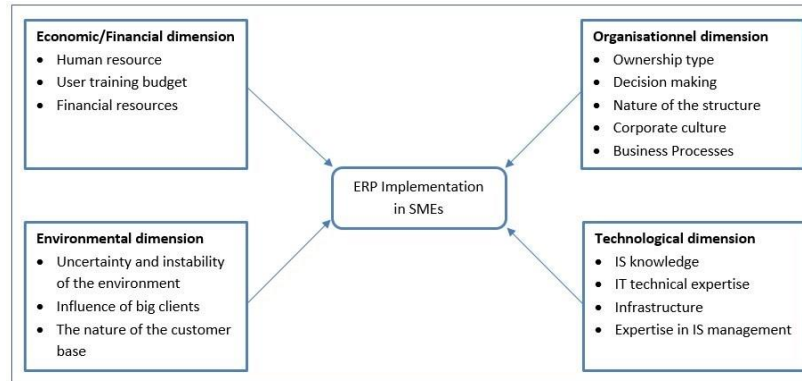


Figure 2. SME characteristics grouped by dimension

### 2.2.1. Economic/financial dimension

#### – Human resource

SMEs are very limited in human resources; they do not generally have the capacity to develop and manage their own IS and are therefore likely to depend on third parties such as suppliers and IT experts.

#### – User training budget

SMEs tend to invest less in employee training than in larger companies that have resources to develop customized training and education programs.

#### – Financial Resources

Research on ERP systems shows that reasonable costs and short deadlines for implementation are identified as the most important selection criteria in SMEs. Given the limited availability of resources, companies were reluctant to adopt an ERP system.

### 2.2.2. Organizational dimension

#### – Ownership type

In most SME, owners are often the managers of the company, they can control and generally oversee all aspects of the business. Often, they are the only ones with the responsibility and access to the information needed to identify opportunities to use IT for strategic or competitive purposes

#### – Decision-making

Decision-making is usually centralized with fewer management levels and decision-makers. Centralized decision-making implies that the CEO can be either the main obstacle or the main catalyst for change.

#### – Corporate culture

Employees in SMEs typically consider the company as a single entity. The unified culture is a factor that can influence change in SMEs because employees easily capture the company's motives. In addition, compared to large companies, the culture in SMEs is more organic and fluid. At the same time, due to the dominance of owner-managers of SMEs, culture is easily shaped and influenced by their personality and vision.

#### – Nature of the structure

Compared to larger companies, SMEs have a flatter and less complex structure. A flat structure results in a more flexible work environment and a less complex communication process. In addition, SMEs are also likely to have an organic structure. Small business workers often perform various tasks, which implies a low degree of specialization in the jobs of employees.

#### – Business processes

Processes in SMEs are often more flexible and adaptable to the changes that occur around them. As a result, SMEs are likely to be more adaptable to the implementation of new initiatives, as they are less likely to be similar to their existing processes.

### 2.2.3. Environmental dimension

Uncertainty and instability of the environment: SMEs are generally characterized by a high level of environmental uncertainty. The uncertainty of the technological environment and competition is likely to significantly affect the implementation of information systems in SMEs.

- The influence of big clients

The main customers or suppliers of SMEs, who are generally powerful in their supply chain, can force SMEs to a system compatible with their existing solution and thus influence the ERP implementations in these organizations.

- The nature of the customer base

The SME market is essentially local, while few of them are international in scope. In general, SMEs depend on a small customer base with more frequent and closer contact with their customers. It is for this reason that SMEs are looking for simple and less expensive solutions.

### 2.2.4. Technological dimension

- Technical expertise in IT

SMEs are limited by their technical expertise in IT. Many SMEs have a low level of IT expertise to successfully adopt the IS. For this reason, SMEs are more likely to buy a software package instead of developing a system internally. This argument was supported by a recent study on the adoption of the ERP system in SMEs [8], which pointed to a lack of IT professionals and a shortage of resources in development. Also, the reference [7] reported that SMEs did not have the technical expertise to evaluate information systems.

- IS Knowledge

Most SMEs have little knowledge of information systems, as there are generally not enough management skills to plan, organize and guide the use of information resources. A study by [7] evaluating the adoption of ERP in SMEs concluded that lack of knowledge about information systems can prevent SMEs from adopting ERP systems. The results showed that the more CEOs have knowledge of IS, the more likely they are to adopt ERP systems.

- Infrastructure

The hardware and software infrastructure of the IS in most SMEs is generally perceived as being at an early stage of development. A study assessing the readiness of SMEs to adopt ERP showed that most of the SMEs surveyed had old hardware infrastructure and used rather complex IT solutions [15]. Expertise in IS management: SMEs are limited by their managerial expertise in IS. Many SMEs have a low level of managerial expertise to successfully adopt the IS. This is because SMEs are more likely to hire external consultants to properly manage the ERP implementation project.

## 3. RESEARCH METHODOLOGY

The purpose of this study is to find new perspectives on the characteristics that influence the implementation of ERP in SMEs, for this reason an exploratory qualitative research approach using multiple case study design has been applied. An exploratory approach prevents limiting research to confirming previously identified results [16, 17]. Case studies have also been widely used in ERP research [18]. The choice to use a multiple case study was to allow a cross-comparison of the characteristics that influence the implementation of ERP in SMEs.

To optimize diversity between cases, organizations differ in terms of organizational characteristics (e.g., size, sector) and ERP project characteristics (e.g., number of implemented modules). Our study fits into this research stream to employ a method of researching multiple case studies. Four SMEs were studied. This number is believed to provide sufficient empirical bases for generating the theory [19]. Cases were selected based on a mix of opportunistic sampling strategies, targeted strategies, and snowball strategies [20]. All case organizations operate in the private sector in Morocco. In addition, the variety between cases was desired, with particular emphasis on the type of business. Organizations are labeled as CompA, CompB, CompC and CompD. Table 1 gives an overview of the cases studied.

The data collection was done through personal interviews, with a total of 28 interviews conducted in the four organizations between October 2017 and July 2018. The interviews were conducted with several stakeholders (users, external consultants, internal IT specialists and managers) in order to gather different perspectives in the implementation of the ERP system and thus improve the validity of the results. Most of the interviews took place face-to-face in the companies. The interviews lasted from 30 to 90 minutes. Documents were provided by the organizations to complete the research. E-mails and telephone exchanges were used to clarify certain issues.

The interview data was fully transcribed and coded using the software Atlas.ti 7. The data analysis focused on identifying the characteristics that influence the implementation of ERP in SMEs. First, an internal

analysis was done to understand the individual cases [19]. This provided a preliminary list of features that influence the implementation of ERP in SMEs in each case. Then, a cross-sectional analysis was conducted, looking for similarities and differences between cases. The data was then analysed as part of the ERP life cycle, with the identified activities assigned to the different phases [21].

Table 1. Presentation of the case studies

	CompA	CompB	CompC	CompD
Nature and industry	Aeronautic	Automobile	Transport & Logistics	Office Supplies
Number of employees	174	190	24	20
Turnover	45 M Dhs	39 M Dhs	4 M Dhs	2 M Dhs
number of interviews	8	9	6	5
interview participants	Users, Team leader, External consultants, Internal IT specialists, Managers.	External consultants, Internal IT specialists, Sales Managers, Users.	Users, Team leader, External consultants, Internal IT specialists, Managers.	Users, Internal IT specialists, Purchasing manager, Vendor.

## 4. DATA ANALYSIS

### 4.1. Cross comparison

Table 2 shows the main features of the ERP implementation projects in all four cases. Case companies represent different phases of the ERP lifecycle, ranging from 10 months (CompA) to 3 years (CompD) of experience with the ERP system at the time of data collection. Based on the stages of the life cycle presented by [11], three of the companies (CompA, CompB and CompC) were in the "use and maintenance" phase, while the company CompD) was in the evolution phase. The following two modules were implemented in all projects: sales management, purchasing management. Apart from this, other modules have been implemented according to the needs of each company [21].

CompA is a Moroccan SME operating since April 2008 and specialized in the assembly of parts and subassemblies aeronautics, manufacture of boilers or surface treatments are the main services offered to customers. The company operates on a single site, located in a big city in Morocco. In January 2016, CompA decided to replace their old system with a new one. After a thorough selection process, the GPAO Clipper 6 system was selected in June 2016. A small local IT company has been chosen as the implementation partner of the ERP. The organization has applied some form of ERP system customization, through the modification of ERP source code and the programming of add-ons. The complete system was officially launched in late December 2016.

CompB, founded in 1990, is a pioneer in the distribution of spare parts for regional and international office networks, production units and warehouses, making it one of the most respected companies in Morocco. They offer the following products: accessories, spare parts, lubricants, chemicals. (Automotive Care Products), Batteries, Tires, Bearings, Filters, Tools and Hardware. In January 2016, the company set up EHP7 for SAP ERP 6.0. The ERP system was implemented by the software editor, while an in-house team was also involved in the project. The company applied an average level of programming of add-ons and did not apply the modification of the source code ERP, their objective was to opt more on the configuration and less on the customization, following the motivation of the CEO and the involvement of the local team as well as the competence of the expert sent by the software editor, the project has been completely successful either in terms of response to the need or compliance with the deadline [22].

CompC, founded in 2009, is an international transport company offering a range of services including road transport (groupage and complete), maritime transport (LCL, FCL) as well as a network that optimizes cargoes in air transport. Via a network of agents worldwide, the company offers its customers a quality of services recognized by international standards. it operates on a unique site located in a big city in Morocco. In January 2016, the company decided to replace the existing IS solution, which had become obsolete and no longer met the needs of the company. The requirements of the ERP system were mainly focused on maximum process automation, the possibility of extended program changes and the opening of the system for additional extensions. In October 2016, the company set up Odoo V9. The ERP system was implemented by an internal team, the CEO was also actively involved in the entire implementation process. The CompC has applied a high level of add-on programming and a moderate level of ERP source code modification.

CompD is a Moroccan SME operating since April 2007 and specialized in the importation and distribution of school supplies and office automation. It enjoys a strong national image and an undisputed reputation. After only 3 years of its launch, the company has been able to position itself as a leader in the school notebook market. The legacy IS solution became inadequate as the company expanded and the need for a more sophisticated system was felt. In October 2014, the company has implemented Sage 100 ERP system was implemented by an internal team, the CEO was also involved in the entire implementation process. The CompD has applied a high level of add-on programming and a moderate level of ERP source code modification. In January 2017 the CompD decided to set up the tool "Biznet" for the generation of financial reports.

Table 2. Characteristics of the ERP implementation project

	CompA	CompB	CompC	CompD
Time of “going live “	December 2016	January 2016	October 2016	October 2014
Duration of use since “going live”	10 Months	21 Months	12 Months	36 Months
Solution name	GPAO Clipper 6	EHP7 for SAP ERP 6.0	Odoo V9	Sage 100
Implemented modules	Purchasing Management, Manufacturing, Cost management, Quality management, Financial management	Stock management, Purchasing Management, Sales management, Production management	Logistics management, Human Resource Management, Sales management, Accounting management, Purchasing management.	Accounting management, Inventory management, Sales management, Purchasing management
Previous information system	GPAO Clipper 5	SAP R/3 4.7	Specific solution developed for the company, Excel,	Specific solution developed for the company, Excel,
Implementation partner	Certified agent from IT Consulting	Vendor	Internal IT specialist	Internal IT specialist

#### 4.2. SME characteristics influencing ERP system implementation

The case analysis focused on exploring the influence of the SME context on the implementation of the ERP system. Table 3 as shown represents the results of our data analysis.

##### a. Economic/financial dimension

Financial resources played an important role in the implementation projects for all four cases. The costs of implementing the ERP system were one of the selection criteria in the four case organizations. In three cases (CompA, CompB, CompD) the companies selected inexpensive ERP systems. Limited financial resources influenced the system development strategy in the case organizations. CompA has selected an IT consulting to implement the ERP. CompB called on the solution Editor to set up their ERP system. CompC and CompD relied on the expertise of their internal teams to implement the ERP system. The size of the implementation teams ranged from 4 to 6 (internal team, external consultant).

Limited funding has also significantly impacted user training in CompC and CompD. Training was limited to the main users. CompA and CompB interviewees stated that the time spent on the training was not enough. However, it was difficult to find resources to repeat the training. Even though the ERP implementation projects in the four organizations were considered successful, it was only the CompB that was able to evaluate the results of the ERP. This could be due to limited resources, in terms of money and human resources.

##### b. Organizational dimension

In all four cases, the selection of the ERP system in each company was done by a designated team, but the final decision was made by the company's owners. Besides the main selection criteria in all cases were the openness of the system to changes and the financial and functional requirements. The owners of these companies were not willing to completely adapt their business processes to the ERP system. (CompA, CompC, CompD) emphasized the need to customize ERP systems. The companies felt that their core business processes were unique and did not want to change them.

The unified corporate culture observed in these organizations made it easier for the team that implemented the solution. The importance of the projects for implementing the new solution led employees to fully understand the impact of the project on their working methods. Although some user acceptance issues were identified when using ERP systems in the first place, users generally accepted the system and started using it in their daily routines. One of the perceived successes of the implementation projects was that people started using ERP systems quickly and without serious problems.

##### c. Environmental dimension

In all four cases, the business was dynamic and evolving, with business processes considered unique. Therefore, CompA CompC and CompD have opted more for the customization of the ERP system. The influence of the main SME customers or suppliers directly affects the choice of the ERP solution and the way it will be implemented in these companies, CompA and CompC have been forced to adapt their solution to meet the requirements of their important customers, on the other hand CompD had only small customers but, that was one more reason for them to look for a simple and less expensive solution.

##### d. Technological dimension

All case organizations had very limited technical or managerial expertise in IS. The IT managers of these companies had no experience of implementing ERP systems either technical or managerial level, so CompA selected an IT consultant to implement ERP and CompB called on the solution Editor to set up their ERP system. However, CompC and CompD relied on the expertise of their internal teams to implement

the ERP system. The lack of experience of the implementation team has led to unnecessary customization of the system for CompC and compD. The existing hardware and software infrastructure of the IS in the three companies (CompA, CompC and CompD) is considered to be at an early stage of development with fairly complex IT solutions, this has been considered an obstacle during the implementation of the ERP system.

**4.3. Influence of SME characteristics influencing on ERP life cycle**

The Table 4 presents the influence of the characteristics resulting from the analysis of the studied cases on the activities of the phases of the life cycle of the ERP [11]. The retirement phase of the life cycle has been excluded from the table because the cases do not cover it. The evolution phase was excluded from the table because there is only one case (CompD) that covered it. The table shows that "ownership type, decision-making and financial resources" have been identified as the most influential characteristics of SMEs. By comparing the distribution of influences between the different phases of the ERP lifecycle, the implementation and use and maintenance phase in the framework was mainly affected by the SME context [11]. All of SME characteristics had a considerable influence on the activities of the "adoption decision" phase as well as the "acquisition" phase, but with a degree less compared to the other phases.

Table 3. Effects of the SME context on the implementation of the ERP system

		CompA	CompB	CompC	CompD
Economic/Financial dimension	Human resource	X	X		
	User training budget	X	X		
	Financial resources	X	X	X	X
Organizational dimension	Ownership type	X	X	X	X
	Decision making	X	X	X	X
	Nature of the structure			X	X
	Business Processes	X	X	X	X
	Corporate culture	X	X	X	X
Environmental dimension	Uncertainty and instability of the environment			X	X
	Influence of big clients	X		X	X
	The nature of the customer base				X
Technological dimension	IS knowledge	X	X		
	IT technical expertise	X	X	X	X
	Infrastructure	X		X	X
	Expertise in IS management	X	X		

Table 4. Influence of the SME characteristics on the activities of the ERP life cycle

		ERP Life Cycle															
		Adoption Decision				Acquisition				Implementation				Use & Maintenance			
		Comp				Comp				Comp				Comp			
		A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Economic/Financial dimension	Human resource									X	X			X	X		
	User training budget									X	X			X	X		
	Financial resources					X	X	X	X	X	X	X	X	X	X	X	X
Organizational dimension	Ownership type	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Decision making	X		X	X	X	X	X	X	X		X	X	X		X	X
	Nature of the structure			X	X							X	X				
	Business Processes	X	X	X	X					X	X	X	X				
	Corporate culture									X	X	X	X	X	X	X	X
Environmental dimension	Uncertainty and instability of the environment											X	X				
	Influence of big clients	X		X	X					X		X	X				
	The nature of the customer base				X								X				
Technological dimension	IS knowledge	X	X							X	X			X	X		
	IT technical expertise									X	X	X	X				
	Infrastructure									X		X	X	X		X	X
	Expertise in IS management									X	X						

## 5. RESEARCH SYNTHESIS

The four SMEs studied had many of the same characteristics as those identified in the literature review on the influence of SME characteristics on ERP implementation [6, 8, 9]. Case analysis has shown that "ownership type, decision-making and financial resources" are the most influential characteristics of SMEs. In three of the four companies (CompA, CompC and CompD), major partners had forced SMEs to implement a system compatible with theirs. The lack of knowledge and experience in ERP systems could have limited the implementation of the ERP system in case organizations. (CompA and CompB) relied on implementing partners because they did not have enough technical or managerial expertise to guarantee the success of the implementation project. On the other hand, CompC and CompD relied on the expertise of their internal teams to set up their ERP systems, this decision was taken to reduce the implementation cost, but it affected the end result since the internal team did not have enough expertise to properly lead the project [22, 23]

SME context had influenced the ERP implementation projects in the four companies. The above showed that some characteristics of SMEs have had a significant impact, while others have had limited influence. Limited resources have affected various issues in ERP implementations. Limited financial resources affected the acquisition, implementation and use and maintenance phase (ERP price, implementation cost and end-user training ...). Projects were limited by limited human resources as most members of the implementation team were working on other projects in parallel. The owners of these companies have been involved throughout the ERP lifecycle. They have significantly influenced the requirements of the ERP system and their selection. The motivation of the heads of these companies was limited to the replacement of obsolete legacy systems. The quick decision-making process may be due to a flat organizational structure that revolves around the CEO of the company. The results showed that the simple structure could facilitate the implementation of the ERP system and the specification of the requirements by simplifying the internal communication processes (less formality and less hierarchy compared to large companies).

Business process reengineering (BPR) is considered to be one of the key success factors for implementing an ERP system [24, 25], but it has been used only by CompB, but with a minimal degree, case companies have chosen to customize the ERP system with different levels for each company, CompA has applied a higher level of ERP source code modification than programming add-ons. So much so that CompC and CompD applied higher levels of add-on programming than ERP source code modification, whereas CompB applied an average level of add-on programming and did not apply the modification of the ERP source code, their goal was to opt more for the configuration and less on the customization [23]. The main reason for customizing the ERP system was to preserve the core business processes, perceived as unique and offering a competitive advantage.

## 6. CONCLUSION

The purpose of this study was to identify the different characteristics of the context of SMEs that can influence the implementation activities of the ERP. By specifying the influence of each characteristic on one or more phases of the ERP life cycle (established by Estève & Pastor). The study showed that "ownership type, decision-making and financial resources" are the most influential characteristics of SMEs. By analysing the characteristics identified in relation to phases in the ERP life cycle, "implementation and use and maintenance" were the most affected by the SME context.

The study provides several implications for research. The results show that the SME context influences the implementation of the ERP system and should therefore be taken into account in future research. The number of cases in our study is limited and it is necessary to study the applicability of our results in other SMEs. However, it is a qualitative exploratory study that aims to examine in depth the influences of the SME context. The results of this article can be considered as a reference for SMEs who want to set up an ERP system, knowing that SMEs can be more vulnerable to project failure than large structures because of limited resources or low organizational maturity. SMEs should focus on an in-depth analysis of business processes. The study provides several avenues for future research to explore, including the role that decision-making plays in the adoption of an ERP system in SMEs.

## REFERENCES

- [1] Morabito V., Pace S., Previtali P., "ERP Marketing and Italian SMEs," *European Management Journal*, vol. 23, no. 5, pp. 590-598, 2005.
- [2] Koh S. C. L., Simpson M., "Could enterprise resource planning create a competitive advantage for small businesses?," *Benchmarking: An International Journal*, vol. 14, no. 1, pp. 59-76, 2007.
- [3] Buonanno G., Faverio P., Pigni F., Ravarini A., Sciuto D., Tagliavini M., "Factors affecting ERP system adoption: A comparative analysis between SMEs and large companies," *Journal of Enterprise Information Management*, vol. 18, no. 4, pp. 384-426, 2005.



- [4] Mabert V. A., Soni A., Venkataramanan M. A., "The impact of organization size on enterprise resource planning (ERP) implementations in the US manufacturing sector," *Omega*, vol. 31, no. 3, pp. 235-246, 2003.
- [5] Wong K. Y., Aspinwall E., "Characterizing knowledge management in the small business Environment," *Journal of Knowledge Management*, vol. 8, no. 3, pp. 44-61, 2004.
- [6] Ramdani B., Kawalek P., Lorenzo O., "Predicting SME's adoption of enterprise systems," *Journal of Enterprise Information Management*, vol. 22, no. 1/2, pp. 10-24, 2009.
- [7] Shiau W. L., Hsu P. Y., Wang J. Z., "Development of measures to assess the ERP adoption of small and medium enterprises," *Journal of Enterprise Information Management*, vol. 22, no. 1/2, pp. 99-118, 2009.
- [8] Chang S. I., Hung S. Y., "Critical Factors of ERP Adoption for Small- and Medium- Sized Enterprises: An Empirical Study," *Journal of Global Information Management*, vol. 18, no. 3, pp. 82-106, 2010.
- [9] Zach O., Munkvold B.E., Olsen D. H., "ERP system implementation in SMEs: Exploring the influences of the SME context," *Enterprise Information Systems*, vol. 8, no. 2, pp. 309-355, 2014.
- [10] Ghobadian A., Gallea D., "TQM and organization size," *International Journal of Operations and Production Management*, vol. 17, no. 2, pp. 121-163, 1997.
- [11] Esteves J., Pastor J., "An ERP Lifecycle-based Research Agenda," *First International Workshop on Enterprise Management Resource and Planning Systems EMRPS*, pp. 359-371, 1999.
- [12] Seethamraju R., Seethamraju J., "Adoption of ERPs in a Medium-sized Enterprise-A Case Study," *Proceedings of Australasian Conference on Information Systems (ACIS)*, 2008.
- [13] Levy M., Powell P., "Information systems strategy for small and medium sized enterprises: an organisational perspective," *The Journal of Strategic Information Systems*, vol. 9, no. 1, pp. 63-84, 2000.
- [14] Upadhyay P., Jahanyan S., Dan P. K., "Factors influencing ERP implementation in Indian manufacturing organisations: A study of micro, small and medium-scale enterprises," *Journal of Enterprise Information Management*, vol. 24, pp.130-145, 2011.
- [15] Raymond L., Rivardi S., Jutras D., "Evaluating Readiness for ERP Adoption in Manufacturing SMEs," *International Journal of Enterprise Information Systems*, vol. 2, no. 4, pp. 1-17, 2006.
- [16] Yin, R. K., "Case Study Research: Design and Methods," *Sage Publications, Inc.*, 2009.
- [17] Rothenberger M. A., Srite M., "An Investigation of Customization in ERP System Implementations," *IEEE Transactions on Engineering Management*, vol. 56, no. 4, pp. 663-676, 2009.
- [18] Schlichter B. R., Kraemmergaard P., "A comprehensive literature review of the ERP research field over a decade," *Journal of Enterprise Information Management*, vol. 23, no. 4, pp. 486- 520, 2010.
- [19] Eisenhardt K. M., "Building Theories from Case Study Research," *The Academy of Management Review*, vol. 14, no. 4, pp. 532-550, 1989.
- [20] Miles M. B., Huberman A. M., "Qualitative Data Analysis: An Expanded Sourcebook," *Sage Publication Inc.*, 1994.
- [21] Khadrouf O., Chouki M., Talea M., Bakali A., "ERP System Customization in Moroccan SMEs," *Proceeding of the IEEE International Conference on Technology Management, Operations and Decisions (Marrakech, Morocco)*, 2018.
- [22] Leknes M., "The role of knowledge management in erp implementation: A case study in Aker Kvaerner," *Proceedings of the 14th European Conference on Information Systems*, 2006.
- [23] Olson D. L., Staley J., "Case study of open-source enterprise resource planning implementation in a small business," *Enterprise Information Systems*, vol. 6, no. 1, pp. 79-94, 2012.
- [24] Khadrouf O., Talea M., Bakali A., "Critical Success Factors in the implementation of (ERP) in Moroccan companies," *Inter. J. of Advanced Studies in Computers, Sci. and Eng.*, vol. 6, no. 12, pp 8-15, 2017.
- [25] Ahmed S., "Critical Success Factors in Enterprise Resource Planning (ERP) System Implementation: An Exploratory Study in Oman," *The Electronic Journal of Information Systems Evaluation*, vol. 18, no. 1, pp. 36-45, 2015.