

Influence of Strategic Priorities of SMEs on Their Decision to Adopt ERP

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Abstract

ERP is a major IT investment for SMEs, which can be considered as a strategic decision. The article tests how strategic priorities of SMEs influence their adoption of an ERP system. An investigation on 203 firms shows that reactivity Strategem is the only strategic positioning increasing the probability to adopt an ERP. Business strategies focused on the characteristics of the products have no influence. In addition, the investigation confirms that the size, the group membership and the IT maturity of SMEs lever ERP adoption.

Keywords: ERP, strategic priorities SME, adoption, econometrics.

Introduction

The increasing computerization of companies is reflected in the widespread use of computer equipment and investment in the latest technologies. Beyond the equipment, the investment in the management software is also essential since these software works on the daily activity of the company's employees. From a historical point of view, three types of software have been adopted, in successive waves: the software houses specifically developed for a given function of the company, then the software of markets acquired and implanted around a dedicated process, and finally Enterprise Resource Planning (ERP). ERPs are market-based software to enable a fully integrated operation of the various business processes (Segrestin et al., 2004). Today, ERP equips and structures the operations of many large companies. According to European statistics, ERP has been adopted by 68% of large firms (more than 250 people). However, they are present in only 44% of medium-sized companies (50 to 249 employees) and 18% of small businesses (10 to 49 employees). The lack of IT usage is feeble in SMEs in India (Tomar, 2017) as it is throughout the globe. It is among these categories of organizations that the economic and organizational stakes are the strongest, because SMEs have become the market to conquer for ERP software vendors while the benefits of this type of integrated software for organizations of reduced size are yet to be demonstrated.

From an academic point of view, the number of studies devoted to analysing the implementation of ERP is now substantial (Schlichter and Kraemmergaard, 2010). Nevertheless, small and medium-sized enterprises have long remained outside the scope of this research. For example, Aloini et al.'s (2007) literature review on the risk factors of the ERP project brings together a total of 75 academic publications published since 1999, of which only one publication is dedicated to the context of SMEs. More recently, Haddara and Zach (2012) proposed an inventory of emerging research on the issue of ERP in SMEs. Their analysis of the literature leads to the observation that the adoption of ERP is studied from the point of view of individual, technical, environmental or organizational factors, but that the strategic dimension is never directly posed. Yet different elements argue for recognizing the strategic nature of ERP for SMEs: because of the large amounts invested in the implementation of ERP, these represent a long-term commitment for companies, i.e. a strategic decision (Mourrain, 2007). In addition, the highly structuring nature of ERP disrupts the entire highly specific and often informal system of management of small structures (Segrestin et al., 2004, Haddara and Zach, 2012). Adopting an ERP therefore involves many challenges for SMEs, both financial and organizational, which make them a strategic choice in the life of these organizations. The link between the adoption of the ERP and the strategic conduct of the firm can therefore be posed. This link has been studied by Beard and Sumner (2004) and Ragowsky and Gefen (2008) who showed that ERP cannot be automatically considered as a source of strategic competitive advantage. The current research aims to complement existing work that analyses the adoption of ERP in small structures by incorporating criteria of a strategic nature. This objective requires taking into account the specificities of the strategies pursued by SMEs, due to the low formalization of their strategic process and the strong

influence of the environment (Marchesnay 1991, Leitner and Guldenberg 2010). The analysis is then conducted by mobilizing the notion of "strategic priorities" that is linked to the decision to adopt an ERP. The research question is formulated as follows: is there an influence of the strategic priorities of SMEs on their decision to adopt an ERP?

In order to answer the research question, this study is structured as follows: In first part, the strategic priorities that encourage SMEs to adopt ERP are identified to build an analytical framework. The framework also incorporates the factors previously identified in the ERP adoption literature. The second part presents the data collection carried out through a survey on the use of Information Technology (IT) in 203 SMEs. The method of statistical analysis used is also exposed. Finally, the last part of the article is devoted to the analysis and discussion of the results obtained.

Determinants of ERP Adoption

ERP systems have very specific characteristics that have a strong impact on the conditions of their adoption by companies. ERP or Integrated Management Software can be defined as a "configurable, modular and integrated application, which aims to integrate and optimize business management processes by offering a single repository and relying on standard business management" (Reix et al., 2011). To be considered integrated, a management package must fulfil several conditions (Lemaire, 2003): to come from a single designer; guarantee the user the uniqueness of the information, by means of a database serving all the modules (an ERP implies at least the presence of two modules working together with the shared data of a database unique); pass on any entry or modification of information in all the modules in real time; ensure the "traceability" of management operations to enable auditing; cover either a complete management function (human resources management, production, etc.) or the entire information system. The logic of integration of the different business lines of the company and the resulting cross-cutting vision are therefore two major effects expected from the ERP (El Amrani et al.2006).

ERP is now a credible option for SMEs that want to rationalize and better integrate their information system. However, the implementation of an ERP remains considered as a project with strong stakes (Deltour and Sargis Roussel, 2010, Deixonne 2011), 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. Many factors have been identified in the literature as potentially affecting the decision to adopt an ERP. The current study focuses on questioning the role of the strategic choices of the firm, which constitutes the major contribution to the existing literature. The methodology also incorporates control variables, which are the recognized adoption factors that are found to be the most influential in the adoption of ERP.

Adoption of ERP and Strategy Priorities

The link between IT policy and strategic business choices is a concern both operational (Luftman et al., 2006) and academic (McLaren et al., 2011). Thus, McLaren et al. (2011) recently proposed to build a multilevel measure of fit between the competitive strategies of companies and their organizational skills derived from their information systems. This research, focused on strategic priorities as factors of adoption, completes this questioning. The strategic priorities followed by a firm can thus participate in understanding its policy in terms of information technologies. The approach in this study is then contextualised to a particular IT-ERP in a specific context of SMEs, bringing particularly strong stakes, both from an organizational and an economic point of view.

ERP and their strategic dimension for SMEs.

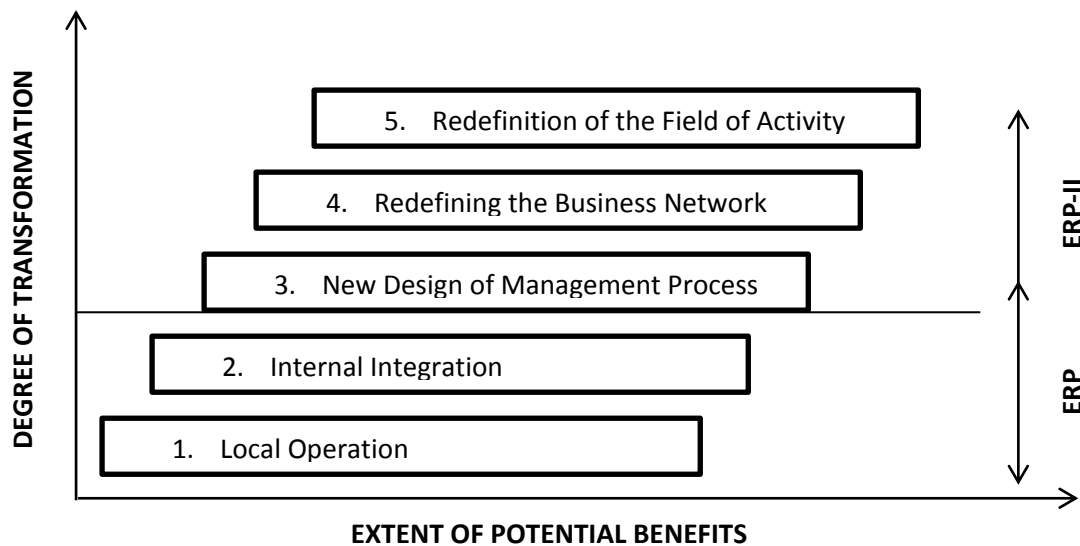
The strategic dimension of ERP can be understood in two complementary senses. First, there is the idea that investing in an ERP is an activity that is strategic in nature. Secondly, it should be noted that the very functionalities of ERP do not participate directly in the definition of a strategy, but rather support the strategic choices that have been made in the company.

Investing in an ERP is a strategic activity of SMEs for several reasons. Significant amounts are invested in the implementation of ERP, which represents a long-term commitment for companies. In small structures, the decision to adopt an ERP is of the sole manager or the management committee of the company (Mourrain, 2007). ERPs are then implanted in small organizations characterized by low formalization of roles, predominance of mutual adjustment and direct supervision, or limited resources (Marchesnay, 1991). As Rougès et al. (2007) note, "the capacity of an SME to absorb failures is limited. The choice to invest in IT is therefore, even more than in large companies, a major strategic issue."

The ERP functionalities support the strategic choices of SMEs. Indeed, the main organizational features associated with ERP are those of functional integration and standardization. ERP is an element of reinforcement of the

transversality in the company, between the various trades such as the sale, the production, the finance, the human resources, the supplies, etc. (El Amrani et al., 2006). Similarly, the predefined processes in the ERP modules are more or less strongly parameterized during implementation. By basing the operation of their business processes on ERP, companies seek the optimization of the various flows necessary for their activity (information flows, physical, financial) and seek to avoid various pitfalls such as multiple entries of information, redundancies and frequent inconsistencies of information or lack of data for the management of the business. These expected benefits in terms of functional integration are potentially important for the company, but do not necessarily transform its strategy. To be convinced of this, it is possible to refer to the model of Venkatraman (1994) which analyses the rise of information systems by proposing several stages of computerization. Only the highest steps affect the company's strategy (Figure 1).

FIGURE 1: ERP's place in the evolution of the definition and impact levels of information systems



The characteristics of the ERP place it on the Venkatraman model at intermediate levels 2 and 3, associated with internal integration as well as the reconfiguration of management processes (Schlichter and Kraemmergaard, 2010). Level 4, related to relationships with external partners, is potentially affected by the recent deployment of modules dedicated to supply chain management; this is called ERP II (Koh et al., 2011). However, the dimension of strategic choices such as the development of new activities is mainly at level 5. The intermediate positioning of the ERP makes it an indirect potential support for other IT whose strategic effects are more direct. Thus, Ash and Burn (2005) studied how the presence of an ERP can be a prerequisite for the implementation of a new e-business web strategy.

Ultimately, this study supports the idea that ERP is not a determinant of business strategy, but supports the existing strategy. As indicated by Mourrain (2011) through twelve SME ERP case studies, "The companies in our sample do not expect the IT / IT integration project to have a direct effect on their business strategy". This research is well positioned in an approach where the ERP participates and supports the implementation of strategic choices made upstream. Following this vision, ERP becomes a resource for achieving the targeted competitive advantage (Kalling, 2003). This raises the question of whether the ERP is better suited to certain strategies than others.

SME strategy approach through strategic priorities

The study of strategy as an analysis of goals and general policies implemented in companies is a field of research in itself. In strategic management literature, two main approaches coexist: strategy as a result and strategy as process. The first approach focuses on the study of strategic positions within a sector. The second looks at how the strategy is constructed, formulated and implemented. This study favors the first approach because it is a question of apprehending the choices of strategy in connection with the policy of information system. It is therefore a Porterian perspective that is retained. The strategy is seen as a set of offensive or defensive actions designed to create a competitive advantage that allows the company to make its investments profitable (Porter, 1986). However, in the context of SMEs, the question of the establishment of a strategy takes on a particular importance that must be taken into account: for an SME, the question of existence of a formalized strategy arises (Marchesnay, 1991). The twelve case studies conducted by Mourrain (2011) recall that SMEs have little or no explicit strategies. Moreover, as Rougès et al. (2009b) point out, there is a lack of clarity for SMEs regarding the multiple dependencies on the business environment which leads to a double dynamic. In "double dynamic: the strategy is imposed from the top and it emerges from the decisions put in place by operational managers because of their changing environment". In this context, clearly identifying the strategy followed by an SME is not easy and some companies may not have a clear strategy (Leitner and Guldenberg, 2010). This leads the current study to understand the strategy through different strategic priorities, rather than adopting a classic typological approach. The strategic priorities approach is more relevant because it provides a way to understand how business strategy is operationalized.

The concept of strategic priorities has been applied in particular by Yen and Sheu (2004) in the context of ERP. The authors identify in the literature the following four criteria of strategic priority: price, quality (quality of design and quality of execution), delivery (commitment to achieve, speed of realization) and flexibility (flexibility of

customization, flexibility of volume). These elements are used in case studies to understand the process of implementing ERP. For its part, Stratman (2007) distinguishes two forms of strategic orientation: strategic focus on operations (internal improvement) and strategic focus on the market (improvement vis-à-vis customers and competitors). These two categories of strategic priorities are taken up in the current study by slightly modifying the one related to the market focus that is extended to the concept of product / service focus offered to the customer, as apprehended by Yen and Sheu (2004). In the end, this study considers two categories of competitive strategies. The first, product oriented, corresponds to the search for an advantage specific to the good or service performed. This advantage can reside in the novelty, the personalization of the good or its technical quality. The second category focuses on the competitive conditions of supply. It can result in greater responsiveness or price advantage.

Strategic priorities as a factor in the adoption of ERP: the assumptions

The literature on the adoption factors of ERP has scarcely addressed the issue of the role of the strategy or competitive priorities. Some studies exclude this variable from entry, even if they recognize its potential role (Seddon et al., 2010). The absence of strategic thinking is recognized as a major risk in the initial phases of an ERP project (Aloini et al., 2007). Other research focuses on the role of the strategy not on the decision to adopt ERP, but on its implementation process and the benefits that can result as found in the work of Maddox and Boyle (2007), Yen and Sheu (2004), Somers and Nelson (2003) and Kouki et al (2009). The results of the work of various researchers are studied to feed the hypothesis on the strategic priorities as factors of adoption of ERP.

Work of a qualitative nature emphasizes the effective influence of the strategic dimension in the implementation of ERP. Through four case studies (three large companies and one SME), Maddox and Boyle (2007) identify the failure to take corporate strategy into account when implementing an ERP as a benefit-altering element. Similarly, Yen and Sheu (2004) study five US and Taiwanese industrial firms and their research confirms that the implementation of ERP must be in accordance with the firm's competitive strategy. In their conclusion, they indicate that "When firms choose a strategy of flexibility or quality of execution, these competitive priorities affect implementation practices in terms of centralization, software configuration, information sharing, type and effort of adaptation, and access to data. Finally, Kouki et al., (2009) show in a comparative case study of two companies (an SME and a large company) that the process of assimilation of ERP goes, inter alia, at the strategic level through recognition within companies of the contribution of ERP as "an important tool for operational efficiency." This contribution of ERP to business performance objectives is also confirmed by quantitative studies.

Numerous quantitative research, such as those by Raymond and Bergeron (2008) or Sabherwal and Chan (2001) have linked firms' IT adoption behaviors to their strategic positioning. The argument is that defender-type enterprises, characterized by a focus on low-cost production, rapid delivery and economies of scale, are companies whose "objectives can be achieved by use of technologies such as EDI and ERP for the efficiency of the internal and external value chain" (Raymond and Bergeron, 2008). Conversely, firms with a "prospector" or "analyst" strategy invest in IT that helps with decision-making, market analysis, or competitor analysis (Sabherwal and Chan, 2001). These results were obtained from large or medium-sized firms (Sabherwal and Chan, 2001) but also from small companies (Raymond and Bergeron, 2008). They can be taken up and refined as part of the specific adoption of ERP in relation to the strategic priorities of SMEs.

The current study have previously distinguished two categories of competitive strategies, one oriented around the qualities of the product or the service marketed (its novelty, its personalization, its variety, its technical qualities), the other around the conditions of supply of the product (price positioning and customer responsiveness). The evidence presented allows hypothesizing that the ERP does not directly support the achievement of strategic priorities focused on products and services. On the other hand, ERP can be a strong support for companies that orient their strategy towards operational efficiency by helping to optimize production and thus lower costs and increase responsiveness of these SMEs. Based on the above fact, following two hypotheses could be formulated:

Hypothesis 1: The strategic priorities of SMEs focused on supply conditions positively influence the adoption of an ERP.

Hypothesis 2: Strategic priorities of product-centric SMEs do not influence the adoption of an ERP.

Other Determinants of ERP Adoption: Taking Control Variables into Account

During the arbitration phase that precedes the adoption or not of an ERP, companies analyse the utility of such a tool according to several parameters. This section discusses the determinants of ERP adoption that are introduced in

current research model as control variables (Figure 2). In the literature, these factors have been classified into several categories. Even if the names of these categories differ according to the authors, their contents are close and evoke with a few exceptions, identical factors explaining the adoption of ERP. These are typically organizational, technological or environmental factors (Tornatsky and Fleischer, 1993). These factors are taken up here according to two main categories: the general characteristics of the firm on one hand, and its IT profile on the other hand. Environmental factors are not retained here because they are by nature integrated into the question of the strategic positioning of companies. Similarly, a complementary dimension of the leader's personality has also been highlighted in some work on the adoption of ERP by SMEs (Chang et al., 2010, Ramdani et al., 2009). The current research views that the profile of the manager impacts the company's overall policy in terms of investment in information technology more than the decision to specifically adopt ERP. This potential influence is therefore captured in our model by the degree of overall computerization of the company.

The general characteristics of the firm

Size and sector of activity. The organizational complexity of increasing the size of an organization can push it to adopt an ERP. This size effect is demonstrated empirically by Mabert et al (2003), Buonnano et al (2005) or Raymond and Uwizeyemungu (2007). The choice of whether or not to adopt an ERP can also be affected by the business sector, as some sectors are more resource-hungry in order to manage the complexity inherent in their trades (Raymond et al., 2006). This is particularly the case in the industrial sector, where production processes can be very fragmented, compared for example to the sales sector, where activities take place in a much smaller number of stages (Buonnano et al., 2005). In accordance with these different studies, the current study will test the effect of firm size and industry membership on the probability of adopting an ERP.

Group membership. The adoption of an ERP is possible for any type of business, whether it belongs to a group or not. Balzi et al., (2006), in a study of a sample of 687 Swiss SMEs, found that only 44% of the 125 firms with an ERP belong to a group (holding or otherwise). However, belonging to a group often requires the units that constitute it to coordinate. The goal is to standardize the different stages that make up the production processes, be it between each unit and the leaders of the group or between the different units (Kocoglu and Moatty, 2010). This coordination imperative naturally generates additional information flows that can favor the adoption of ERP. Membership in a group can also result in adoption "imposed" on the SME of the integrated system adopted within the group (Dolmetsch et al., 1998). At the same time, Bunanno et al. (2005) showed that the geographic scope of the firm, and in particular the international presence, made the flow of information more complex and could play a positive role in the decision to adopt an ERP. The current study has chosen to introduce group membership as a factor in the adoption of ERP, with a further nuance which is the geographical extent of the group, the flows between the different units of the group being potentially more complex in the international context than in a national context.

Qualification of employees. Another factor that could potentially influence the use of an ERP is the level of qualification of employees. In fact, previous studies show a positive link between the level of qualification of the company's employees and the adoption and use of IT (Hollenstein, 2004, Galliano and Roux, 2007). In the particular case of ERP, Raymond and Uwizeyemungu (2007) showed that the share of executives in the workforce of companies plays positively on their predisposition to adopt an ERP.

The computer profile of the company

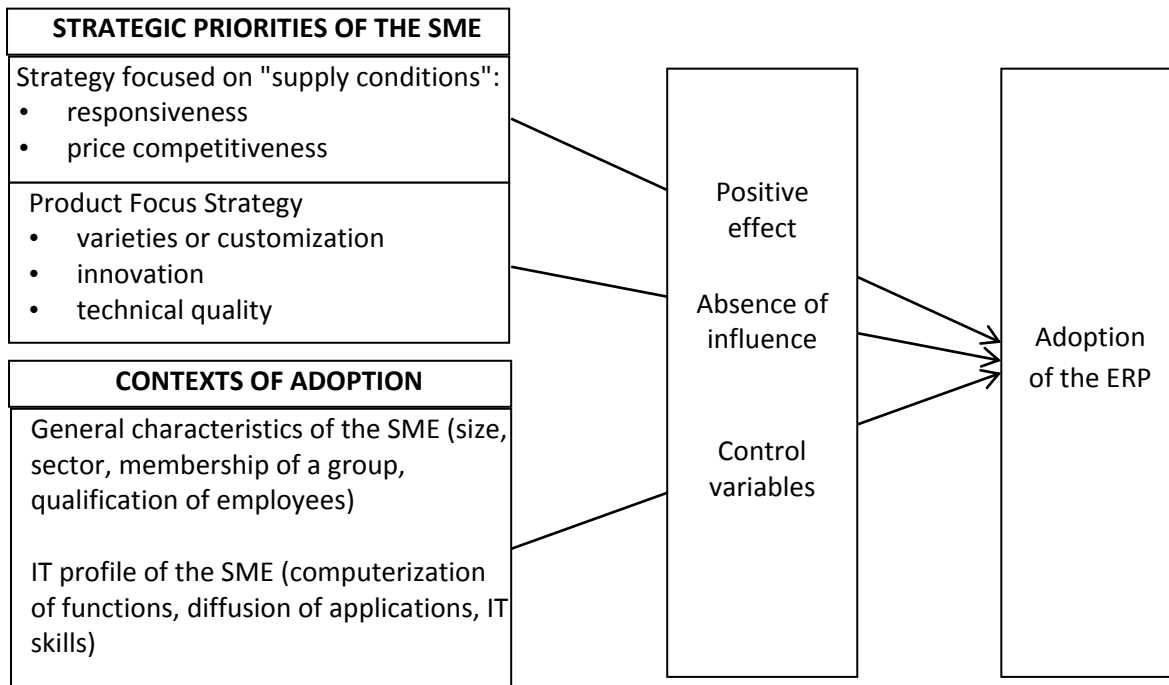
Level of computer use. The integration of an ERP system requires a certain level of preparation for the company, particularly through its technological maturity (Sammon and Adam, 2010). In particular, the existence in the SME of various computerized systems close to or prior to ERP (production support software, planning software, etc.) favors the adoption of an ERP (Raymond and Uwizeyemungu, 2007). Conversely, the lack of prior experience of an information system places an SME in a situation of misinformation about these new technologies and may discourage it from adopting such a system.

Computer skills. Internal IT skills can affect the choice to adopt or not adopt a system such as ERP. These skills can take two dimensions. The first is the familiarity of all employees with computer tools that can influence their ability to take control of a new tool. Chang et al (2010) show that SMEs with employees familiar with information systems are significantly more likely to adopt ERP. The second dimension is the existence of internal skills capable of ensuring the

smooth functioning of the future system. The lack of internal IT skills in SMEs has been identified for a long time as a barrier to IT adoption (Cragg and King, 1993). On the other hand, these competences present in company favor the adoption and the success of the ERP project (Snider et al, 2009).

Finally, the variables mobilized in the research are summarized in **Figure 2**.

FIGURE 2: General model of research



QUANTITATIVE INVESTIGATION WITH INDIAN SMEs

Data Collection and Processing

The data was collected from SMEs situated in the region of Delhi NCR including Delhi, Faridabad, Ghaziabad, and Noida in the industrial, commercial and service sectors. A questionnaire was used and was sent to the concerned executives in these SMEs through mail and Google forms. The study aimed to get 2500 responses from 250 SMEs. The firms were chosen in order to obtain a good final representativeness of the respondents in terms of location, size and sector of activity. The respondents were the administrative decision makers.

The survey is based on a general questionnaire, which first asks the company about its economic situation, and then lists a wide range of equipment and their possible use within the firm, or with external partners. One of the questions is, "Does your company have an ERP?" The answers were then filtered through two types of additional question sets: a series of questions about the ERP modules deployed in the different functions of the company as well as a question about the name of the ERP software and editor. An "expert" practitioner validated that the software package indicated was of the ERP type. When the publisher's or software's indication was incomplete or absent, only those respondents who reported at least two functions of the company as working under ERP were selected. These different filters led to a reduction in the number of companies using an ERP to 81, which represents an adoption rate of 5.3%. After excluding questionnaires with too many missing answers, the total numbers of respondents in the sample were 1473 belonging to 203 SMEs, of which 81 adopted an ERP.

Choice of the Econometric Model

In order to test the hypotheses on the determinants of the adoption of an ERP, current study use a Logit discrete choice model (Cramer, 1991). This type of model makes it possible to model the effect of several variables, independently of each other, on the probability of choosing one of several alternatives. The current study, where the objective is to measure the influence of strategic priorities on the decision to adopt an ERP (rather than not adopting it), uses a Logit binomial model. In this model, the variable "Adopt ERP" which is the dependent variable is 1 if the SME chooses to

adopt an ERP system and 0 if not. This helps to evaluate the influence of SME strategic priorities, as well as other factors, on the probability of adopting an ERP.

Variables Measurement

The study considers three broad categories of variables that can affect the adoption choice of SMEs:

- The strategic positioning variables,
- The general characteristics of the firm, and
- IT profile of the firm.

Strategic priorities of the company

Companies were asked about their choice concerning "key elements of the company's positioning" with five possible response modes: personalization, novelty, technical quality, responsiveness and price competitiveness (several possible answers). The first three factors reflect a product-centric strategic focus, while the last two can be associated with a supply-side strategy. The importance of each of these factors in the company's strategy is integrated into the model as a dichotomous variable that takes the value 1 if the company has identified this factor as a key element of its strategic positioning and the value 0 otherwise.

The general characteristics of the firm

The survey informs about the main characteristics of the company surveyed. The size of the enterprise is integrated in the model as a continuous variable: the number of employees. The industrial activity variable takes the value 1 when the enterprises belong to the industrial sector and 0 otherwise. In line with current analysis of group membership, a variable was constructed with three categories: 0 if the firm does not belong to a group, 1 if it belongs to a regional or national group, and 2 if it belongs to an international group. Finally, the employee qualification variable takes the value 1 when the share of employees of the company with the bachelor's degree is higher than 10% and 0 otherwise.

The computer profile of the company

The IT profile of the firm is characterized by three distinct variables: the level of readiness of the company for adoption, the familiarity of users with IT tools and finally the existence of internal skills. The questionnaire informs us whether the business functions of company are managed through software managed internally, outsourced, or is non-existent. The function information rate is variable, which represents the number of computerized functions in the enterprise over the number of functions performed internally, and is a continuous variable whose value is between 0 and 1.

Also, the companies were asked about their use of the following eight tools: a computerized data interchange system (EDI), an intranet, internal mailing lists, shared calendars, shared workspaces, software for defining or monitoring processes (workflow), "business" software (specific to the company's activity), and electronic certificates. With a goal to measure a "global" learning effect of users, the study has an aggregate variable, which sum these applications used. The application diffusion variable, whose value is between 0 and 8, gives a measure of the know-how and skills acquired by the users.

Lastly, the existence of in-house skills capable of ensuring the smooth functioning of the activity is measured by the IT skills variable, which can take three forms: 2 - if the company has a computer service, 1 - if it has at least one half-time employee or more dedicated to IT (but no IT department), and 0 - if it does not have any of these resources internally.

The frequencies associated with each of these variables, the total sample, the sample of firms that have adopted an ERP and the sample of firms that have not adopted ERP, are presented in table 1 below:

Table 1: Descriptive statistics of the sample

	Explanatory variables	SMEs without ERP	SME with ERP	Full sample	
Strategic priorities of the SME	Varieties and customization (% of companies)	44.8	47.6	44.3	
	Novelty (% of companies)	19.6	23.5	20.4	
	Technical Quality (% of companies)	64.8	64.7	64.8	
	Reactivity (% of companies)	38.1	61.2	38.7	
	Price competitiveness (% of companies)	40.1	50.1	41.1	
General characteristics of the SME	Size of the company (average number of employees)	31.2	63.7	33.6	
	Qualification of employees (% of companies with at least 10% of bachelor graduates)	69.2	89.9	69.4	
	Industrial activity (% of companies in the industry)	14.9	28.3	14.6	
	Group membership (% of companies)	Membership in an international group	9.1	31.3	9.9
		Membership in a national or regional group	17.9	31.1	17.4
Independent SME		74.3	37.6	72.7	
IT profile of SMEs	Computerization rate of functions (% average of computerized functions)	66.4	87.6	67.3	
	Dissemination of applications (average number)	2.9	4.9	2.9	
	Computer skills (% of companies)	Informatics service	21.3	28.8	21.3
		IT staff	14.1	37.2	14.7
		No computer skills	65.3	34.7	63.8

Result and Analysis

Table 2 presents the coefficients of the different variables, the Student's t value (indicated in parentheses) and the odds ratios associated with these variables. The stars indicate the degree of significance of the variables. For multinomial variables, the reference category is denoted "Ref". For a Logit model, the estimated coefficient of an explanatory variable tells us only about the meaning of the relationship that exists between this variable and the explained variable. It is then customary and recommended to interpret the shear ratios to judge the influence of each explanatory variable.

Table 2: Results of the Logit model on the adoption or not of an ERP

	Explanatory variables	Adopt an ERP		
		Coefficient	Odds ratios	
Strategic priorities of the SME	Varieties and customization	-0.0337 (-0.11)	.968	
	Novelty	0.0272 (0.08)	1.029	
	Technical Quality	-0.0443 (-0.16)	.955	
	Reactivity	0.721*** (2.82)	2.065***	
	Price competitiveness	0.301 (1.22)	1.354	
General characteristics of the SME	Size of the company (average number of employees)	0.00433* (1.86)	1.006*	
	Qualification of employees	0.768* (1.93)	0.468*	
	Industrial activity	0.549* (1.78)	1.723*	
	Group membership	Membership in an international group	1.148***(3.57)	3.137***
		Membership in a national or regional group	0.566* (1.87)	1.758*
Independent SME		Réf	Réf	
IT profile of SMEs	Computerization rate of functions	2.504***(3.88)	12.192***	
	Dissemination of applications	0.169***(2.82)	1.177***	
	Computer skills	Informatics service	0.743** (2.38)	2.117**
		IT staff	0.671** (2.26)	1.966**
		No computer skills	Réf	Réf
Constant		-7.094***(-10.44)		
Number of observations	1473			
Log of likelihood	-266.851			
significance	(* 0.10 ** 0.05 *** 0.01), () Student's t			

The "Reactivity" Strategy as the Only Strategic Determinant of ERP Adoption

In current study, there are two complementary assumptions that the strategic priorities of supply-oriented SMEs positively influence the adoption of an ERP while the product-centric strategic priorities have no influence. The valid regression partially supports the hypothesis of the influence of supply-oriented strategies because only a strategic positioning related to responsiveness has an impact on the probability of adopting an ERP. Indeed, if an SME is in such a position, this multiplies the chances by 2 (odds ratio = 2.063) that it adopts an ERP system. Even the imperativeness and responsiveness towards customers is therefore an element of adoption of ERP. This result is in line with the findings of Kocoglu and Moatti (2010), who thank the ERP as "the managers are then equipped to control the company and control the activity. Activity monitoring enables them to react quickly to supply and market-related hazards and to adapt resources to the level of activity." ERP enables responsiveness desired by companies, because its tools empower transversality, functional integration, and standardization of the internal operation of the firm. It should be noted that, following the case studies conducted by Yen and Sheu (2004), there is no typical ERP implementation method for companies that follow a reactivity objective. Nevertheless, these latter indicate that when a volume flexibility is sought (to adapt to different levels of production), the ERP is implemented according to an objective of information sharing, with a policy of adaptation and advanced settings of the system.

The lack of influence of the strategic price-competitiveness priority on the adoption of ERP is unexpected in light of the assumptions in current study. Yet, the idea that SMEs operating in a price-sensitive or more competitive market are more likely to adopt an ERP has been previously retained and confirmed (Raymond and Uwizeyemungu, 2007, Chang et al., 2010). The initial reasoning was that a market price-competitiveness strategy was internally driven by an operational efficiency policy based on production processes that promoted economies of scale and reduced costs. The adoption of an ERP could then promote this operational efficiency and thus meet the strategic priority of price competitiveness. This lack of influence can also be explained by a possible decoupling between the commercial positioning of the company and ERP's internal cost-optimization policy: seeking a competitive advantage by selling the same goods or services cheaper than its competitors is not systematically linked to an optimization of production processes. Other methods can thus make it possible to achieve this price competitiveness, as for example the setting up of a reduced organization through the use of subcontracting (Gray et al., 2009) involving a limited number of services and personnel, or the use of supplies of raw materials that are cheaper than competitors.

Finally, in line with the assumptions, the regression confirms that none of the product-oriented strategic positioning has any impact on the probability of adoption of ERP. The determinants of novelty, customization, variety and quality have no influence on the choice to adopt an ERP. Issues related to how SMEs can innovate, differentiate or improve their products are independent of the issue of adopting an ERP.

In general, the relatively weak influence of strategic priorities on the choice to adopt an ERP can be put into perspective with respect to the situation of SMEs. Their small size and their focus on operational concerns rather than strategic thinking (Mourrain, 2007) support the outcome of current study. Moreover, Ragowski and Gefen (2008) find that the low volume of activity and the small number of employees in a company are two factors explaining that the ERP is only considered as an element of operational efficiency. This is true with SMEs where ERP is seen as a "critical system in the company's operations" and not as an element of competitive advantage.

General and Computer Characteristics of SMEs as Determinants of ERP Adoption

First of all, concerning the general characteristics of the SME, the outcome of study validates certain number of results present in the literature.

In line with previous work, the size of the company plays a positive role in the probability of adopting an ERP. The weakness of the coast ratio (which is 1.006) can be explained by the choice to keep this variable in its quantitative form: the arrival of only one additional employee in an SME has a weak influence on the chances of it to adopt an ERP.

The type of activity is also one of the characteristics that positively influence adoption. Since it appears that an SME with an industrial activity is 1.7 times more likely to have an ERP than an SME that has a service activity. This result confirms the conclusions of previous studies, notably that of Buonnano et al (2005). In addition, it highlights the specificity of the ERP system compared to other information systems. Ramdni et al. (2009) have shown, with a similar methodology, a sample of 102 small and medium-sized companies, that the business sector (in particular belonging to the industrial sector) did not influence the adoption of integrated systems in the broad sense that include ERP, Customer Relationship Management, Supply Chain Management, and e- procurement.

Regarding the variable belonging to a group, it appears that each of the modalities is significant. The impact of this combined variable confirms the results of previous work that addressed group membership and geographic extent independently (Kocoglu and Moatty 2010, Dolmetsch et al., 1998, Buonnano et al., 2005) and also allows measuring the relative effects of each of these factors. It is indeed interesting to note that the extent of the group abroad has a stronger impact than simply belonging to a group. In fact, the point of belonging to a regional or national group multiplies the chances of adopting ERP by 1.75. The fact that the group is international multiplies the adoption chance by 2, since the ratio of coast for the modality "belonging to an international group" is twice as important for the modality compared to "belonging to a non-international group" (3.14 against 1.75).

Finally, the level of qualification of employees appears to be a factor favoring the probability of adoption of ERP in sampled SMEs. Indeed, for SMEs in which 10% or more of employees have a level of study higher than the bachelor's degree, the chances of adopting an ERP are twice as high as for firms in which the level of education is lower. This result is in sync with the work of Raymond and Uwizeyemungu (2007) on the positive impact of the percentage of executives in the workforce of the company on its predisposition to adopt an ERP.

With reference to the IT profile of the company, the study outcome suggests that all the explanatory variables introduced in the model are significant and have a positive coefficient. According to previous work, the technological maturity of the firm (Sammon and Adam, 2010, Raymond and Uwizeyemungu, 2007), the diffusion of the uses (Chang et al., 2010), and the presence of internal competences in computer science (Cragg and King, 1993, Snider et al, 2009) positively affect the probability of adopting an ERP. Coastal ratios, however, show significant differences in the weight of each variable, particularly in terms of the impact of the computerization rate. Conclusively, the first reading of the results shows that the coast ratio for this variable is 12.2. This figure is high because as for the number of employees, the computerization rate variable has been kept in its continuous form. The result can be interpreted as follows: when an SME goes from no computerized function to all its computerized functions, this multiplies the ERP adoption chances by 12.2. The impact of the TI index which combines the different uses is also positive but the weight of this variable is lower. The model indicates that the increase of one point of the index multiplies the ERP adoption chances by 1.18. Finally, with respect to internal IT skills, the regression shows that an SME with in-house IT skills is more likely to adopt an ERP than an SME that does not. It is also interesting to note that the presence of computer skills increases the chances of adopting an ERP by approximately 2.

Conclusion

ERP is a powerful tool for integrating, sharing information and streamlining processes within organizations (El Amrani et al.2006, Kocoglu and Moatti, 2010). If the organization fully integrated by its information system remains a "myth" (to use the expression of Segrestin et al. 2004), business benefits are nonetheless removed from and organization. These benefits, which may have benefited primarily large companies, are now at the fingertips of small and medium enterprises. Yet the counterpart is large for SMEs. The complexity, the investment, and the cost that incurs in adopting ERP are the major difficulties for these companies, affecting the entire organization. In order to understand the factors that may explain the choice for an SME to use an ERP, this study has reviewed the existing literature while questioning the role of a specific factor: the strategy implemented by the SME.

To answer the research question which aimed to point out the influence of strategic priorities of SMEs on their decision to adopt an ERP, the study with sample of companies output the deliberating results. On one side, the companies focusing their strategic priorities around the characteristics of the products or services sold (their novelty, their personalization, their quality) are not specifically inclined to adopt an ERP. On the other hand, companies strategically oriented towards a form of operational excellence (low costs, high reactivity) are only inclined to adopt an ERP when the objective of "reactivity" is displayed. Strategic issues therefore play a role in the adoption of ERP along with the other influential variables such as membership in an international group, size of firm, degree of computerization, and the existence of internal computer skills.

The study sheds new light, complementary to previous research, on the conditions of adoption of ERP, in the specific context of SMEs. Several managerial implications can be put forward, especially to counter the contingencies in adopting the information systems. For SMEs wishing to adopt an ERP, the outcome of current research can help in the strategic diagnosis to be carried out prior to adoption, especially on the importance that the company attaches to its responsiveness as a factor of competitive advantage. For the providers specialized in the implementation of ERP,

current results disseminates the importance of different profiles on the ERP adoption prospects. The determinants put forward help to identify the prospects who are most likely to adopt an ERP system.

Finally, some limits to this work can be identified. From an empirical point of view, the validation was conducted on a small number of adopting companies, which limited the econometric analysis. From a methodological point of view, the research is confronted with questions of temporality, which are important both in strategy research and information systems. On the basis of the questionnaire, it is evaluated that the link between positioning current strategy is the choice of ERP. However, setting up an ERP takes time and is subject to political games that may also call into question the company's strategy. This dimension is not taken into account here. It requires other methodologies, rather of a qualitative nature. This is what Lee and Myers (2004) investigated in an ethnographic form in which the case study showed that "the firm had an ERP that no longer reflected the strategic objectives of the company". Finally, from a conceptual point of view, the study underlines two current limits, which constitute avenues for future investigations.

The study deals with taking into account the specific intricacies of ERP software. Adopting an ERP means adopting a number of modules that work in an integrated way. The question of the number and type of modules used by companies is not analysed in this research. An in-depth study can therefore focus on the analysis of different ERP profiles adopted by SMEs. This consideration of the different modules is initiated by Hitt et al (2002), who distinguish different ERP profiles in order to analyse the benefits derived by 1117 large US companies.

A second line study in the current work aims to complete the contingency approach between the strategy and the ERP by questioning the performance. The study then approached the perspective of the strategic alignment of Venkatraman (1994). This strategic alignment performance factor was tested positively by Kefi (2011) with a sample mainly composed of SMEs. This link with the performance would be all the more interesting to study as the literature associating IT and performance in the context of SMEs has led to ambiguous results (Rougès et al., 2007). The analysis of the effects of ERP would then be confronted with new limits, more generally related to the question of the dilution of IT organizational impacts (Reix et al 2011): dilution of effects over time, dilution of a technical approach to an organizational approach, and ultimately financial challenges that concern both small and large companies.

Références

1. Aloini D., Dulmin R., Mininno V. (2007). Risk Management in ERP Project Introduction: Review of the Literature. *Information & Management*, 44(6), p. 547-567.
2. Ash C.G., Burn J. M. (2003). A strategic framework for the management of ERP enabled e-business change, *European Journal of Operational Research*, 146 (2), p. 374-387.
3. Balzi E., Equey C. (2006). Study of the behavior of Swiss SMEs / SMIs in adopting an integrated management system: between ignorance and satisfaction. Geneva: CRAG Geneva School of Management, p76.
4. Beard J.W., Sumner M. (2004). Seeking strategic advantage in the post-net era: Viewing ERP systems from the resource based perspective. *The Journal of Strategic Information Systems*, 13(2), p. 129-150.
5. Buonanno G., Favero P., Pigni F., Ravarini A., Sciuto D., Tagliavini M. (2005). Factors affecting ERP system adoption. A comparative analysis between SMEs and large companies. *Journal of Enterprise Information Management*, 18(4), p. 384-426.
6. Chang S.I., Hung S.Y., Yen D., Lee P.J (2010). Critical factors of ERP adoption for small-and medium-sized enterprises: An empirical study. *Journal of Global Information Management*, 18(3), p. 82-106.
7. Cragg P.B., King M. (1993). Small-firm computing: Motivators and inhibitors, *MIS Quarterly*, 17(1), p. 47-60.
8. Cramer J. S. (1991). *The logit model for economists*. London and New York, Edward Arnold.
9. Deixonne, J.L. (2011). *Pilot an ERP project*. Dunod Editions, Paris. 3rd edition, p. 304.
10. Deltour F., Sargis Roussel, C. (2010). Knowledge Integration by ERP Project Teams: Two SME Case Studies. *Information Systems and Management*, 15(1), p. 9-34.
11. Dolmetsch R., Huber T., Fleisch E., Oesterle H. (1998). R/3 implementation in small and midsize companies in Dans Dolmetsch R., Huber T., Fleisch E., Oesterle H. (Eds.), *Accelerated SAP: 4 Case Studies*. Institute for Information Management. University of St. Gallen, p. 51.

12. El amrani R., Rowe F., Bidan M., Geffroy-Maronnat B., Marciniak R. (2006). The effects of the strategy of deployment of the PGI on the transversal vision of the company. *French Review of Management*, 32 (168), p. 267-285.
13. Galliano D., Roux,P. (2008). Organisational motives and spatial effects in Internet adoption and intensity of use: Evidence from French industrial firms. *Annals of Regional Science*, 42(2), p.425-448.
14. Gray J.V., Roth A.V., Tomlin B. (2009). The influence of cost and quality priorities on the propensity to outsource production. *Decision Sciences*, 40(4), p.697-726.
15. Haddara M., Zach O. (2012). ERP systems in SMEs: An extended literature review. *International Journal of Information Science*, 2(6), p.106-116.
16. Hitt L.M., Wu D.J., Zhou X. (2002). Investment in enterprise resource planning: Business impact and productivity measures. *Journal of Management Information Systems*, 19(1), p.71-98.
17. Hollenstein H. (2004). The determinants of the adoption of ICT. *Structural Change and Economics Dynamics*, 15(3), p. 315-342.
18. Kefi H. (2011). Organizational Processes and Information and Communication Systems: Alignment and Performance. *The Journal of Management Science*, 5 (251), p. 189-200.
19. Kocoglu Y., Moatty F. (2010). Dissemination and Combination of ICTs in Businesses in 2006: Networks, Data Management and ERP Integration. *Networks*, 28 (162), p. 37-71.
20. Koh S.C.L., Gunasekaran A., goodman T. (2011). Drivers, barriers and critical success factors for ERP II implementation in supply chains: A critical analysis. *Journal of Strategic Information Systems*, 20(4), p. 385-402.
21. Kalling T. (2003). ERP systems and the strategic management processes that lead to competitive advantage. *Information Resources Management Journal*, 16(4), p. 46-68.
22. kouki R., pellerin R., poulin D. (2009). Antecedents of ERP assimilation: The cases of a medium-sized and a large manufacturing company. Cambridge Scholars Press.
23. Lee J.C., Myers M.D. (2004). Dominant actors, political agendas, and strategic shifts over time: A critical ethnography of an enterprise systems implementation. *The Journal of Strategic Information Systems*, 13(4), 355-374.
24. Leitner K.H., Gldenbergs S. (2010). Generic strategies and firm performance in SMEs: A longitudinal study of Austrian SMEs. *Small Business Economics*, 35 (2), p. 169-189.
25. Lemaire L. (2003). *Integrated Management Systems: Risky Technologies*, Editions Liaisons,p.142.
26. Luftman J., Kempaiah R., Nash E. (2006). Key issues for IT executives 2005. *MIS Quarterly Executive*, 5(2), p.80-99.
27. Mabert V.A., Soni A., Venkataramanan M.A. (2003). The impact of organization size on enterprise resource planning (ERP) implementations in the US manufacturing sector. *Omega*, 31 (3), p. 235-246.
28. Maddox D., Boyle G. (2007). Information technology performance and process: Four case studies. *Perspectives on Irish Productivity*, chapter 22, p. 350-363.
29. Marchesnay M. (1991). SME: a specific management. *Rural economy*, 206, p.11-17.
30. Marsouin(2009). Penetration, dissemination and use of ICT in SMEs, online document available at: <http://www.marsouin.org/spip.php?article292>.
31. McLaren T., Head M., Yuan Y., Chan Y. (2011). A multilevel model for measuring fit between a firm's competitive strategies and information systems capabilities. *MIS Quarterly*, 35(4), p.909-929.
32. Mourrain A. (2007). Strategic investment in pre-implementation as part of an information systems integration project: the case of SMEs, PhD Thesis, University of Western Brittany, p.452.
33. Mourrain A. (2011). The decision to launch an IS / IT integration project and strategic alignment. SME case study. *Proceedings of the 16th AIM Colloquium*, St Denis de la Runion.
34. Porter M. (1986). *Competitive Advantage*, Paris, InterEditions, p.647.
35. Ragowsky A., Gefen D. (2008). What makes the competitive contribution of ERP strategic? *Database for Advances in Information Systems*, 39(2), p.33-49.
36. Ramdani B., Kawalek P., Lorenzo O. (2009). Predicting SMEs' adoption of enterprise systems. *Journal of Enterprise Information Management*, 22(1), p.10-24.

37. Raymond L., Bergeron F. (2008). Enabling the business strategy of SMEs through e-business capabilities: A strategic alignment perspective. *Industrial Management & Data Systems*, 108(5), p.577-595.
38. Raymond L., Rivard S., Jutras D. (2006). Evaluating readiness for ERP adoption in manufacturing SMEs. *International Journal of Enterprise Information Systems*, 2(4), p.1-17.
39. Raymond L., Uwizeyemungu S. (2007). A profile of ERP adoption in manufacturing SMEs. *Journal of Enterprise Information Management*, 20(4), p.487-502.
40. Reix R., Fallery B., Kalika M., Rowe F. (2011). *Information systems and organization management*, 6th edition, Vuibert, p.496.
41. Rougès J.F., Poulin D., D'amours S., Montreuil B. (2007). Information and Communication Technologies, a performance driver for SMEs: an ambiguous literature review. *Proceedings of the International e-Commerce & Internet Governance Conference*, Sousse, 19 & 20 October.
42. Rougès J.F., Poulin D., D'amours S., Montreuil B. (2009a). Relationship between SME performance and information and communication technology. *Information and Communication Technology and Small and Medium Sized Enterprises: From Theory to Practice*, p.25-47.
43. Rougès J.F., Poulin D., Bergeron F., Cimon Y.B. (2009b). The alignment of IT in SMEs and its contribution to performance: Research directions in Information and Communication Technology and Small and Medium Sized Enterprises: From Theory to Practice, p.48-68.
44. Sabherwal R., Chan Y.E. (2001). Alignment between business and IS strategies: A study of prospectors, analyzers, and defenders. *Information Systems Research*, 12(1), p.11-33.
45. Sammon D., Adam F. (2010). Project preparedness and the emergence of implementation problems in ERP projects. *Information & Management*, 47(1), p.1-8.
46. Schlichter B.R., Kraemmergaard P. (2010). A comprehensive literature review of the ERP research field over a decade. *Journal of Enterprise Information Management*, 23(4), p.486-520.
47. Seddon P.B., Calvert C. (2010). A multi-project model of key factors affecting organizational benefits from enterprise systems. *MIS Quarterly*, 34(2), p.305-311.
48. Segrestin, D. ; darréon, J.L. ; trumpet, P. (eds) (2004). "The myth of the integrated organization: management software packages", thematic file, *Sciences of the Society*, No. 61, February.
49. Snider B., DaSilveira G., Balakrishnan J. (2009). ERP implementation at SMEs: Analysis of five Canadian cases. *International Journal of Operations & Production Management*, 29(1), p.4-29.
50. Somers T.M., Nelson K.G. (2003). The impact of strategy and integration mechanisms on enterprise systems value: Empirical evidence from manufacturing firms. *European Journal of Operational Research*, 146(2), p.352-364.
51. Stratman J. K. (2007). Realizing benefits from enterprise resource planning: Does strategic focus matter ?. *Production and Operations Management*, 16(2), p.203-216.
52. Tomar J.S. (2017). State of IT adoption in SMEs in India. *Prabandhan: Indian Journal of Management*. 10(1), p.40-53.
53. Tornatsky L.G., Fleischer M. (1993). *The process of technological innovation*, Lexington Books, Lexington, MA.
54. Venkatraman N. (1994). IT enabled business transformation: From automation to business scope redefinition. *Sloan Management Review*, 35(2), p.73-87.
55. Yen H.J., Sheu C. (2004). Aligning ERP implementation with competitive priorities of manufacturing firms: An exploratory study. *International Journal of Production Economics*, 92(3), p.207-220.