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IMPLEMENTING ENTERPRISE RESOURCE PLANNING IN SMALL ENTERPRISES: A CASE STUDY

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Abstract
Not much evidence is available regarding ERP implementation in developing countries and small enterprises. By presenting results of a case study on ERP implementation in a small enterprise in Croatia, this paper represents a contribution in this regard. This research focused on three areas: ERP implementation process, outcomes and success factors. In the surveyed company, ERP system produced benefits such as integration of internal processes, costs reductions and improved productivity based on single-loop organizational learning. It can be concluded that ERP systems represent a prerequisite for successful performance for small enterprises but not necessarily a significant source of competitive advantage.

Keywords: enterprise resource planning, small enterprises, success factors, change management, organizational learning

JEL classification codes: M15, L25, D83

Introduction

Small and medium sized enterprises (SMEs) face numerous challenges. They are expected to be flexible and responsive to customer expectations, adjust to sudden changes and continuously learn and improve their capabilities to take advantage of growth opportunities. Their business models often rely on coordination with larger systems, which is highly dependent on ICT. In SMEs, these goals can be achieved by implementing ERP systems. ERP enables tracking of enterprise transactions as well as coordination of intraorganizational and interorganizational activities and operations. By providing real time data and enabling various financial and operational reports, ERP enables concurrent control, as well as forecasting of future developments. ERP systems therefore integrate operational and managerial perspective, especially regarding strategic decision-making.

The goal of this paper is to examine the process of ERP implementation and its outcomes in small enterprises. The interpretative (case study) approach was used to capture the contextual complexity of ERP implementation. The study is based on a comprehensive questionnaire designed in accordance with previous findings, providing a strong theoretical background. The case study approach enabled in-depth insights and detection of causality. By performing an exploratory case study, our attempt was to tentatively build rather than test theory. In sum, the paper addresses several research questions:

RQ1: What is the nature of the process of implementing ERP in small enterprises?
RQ2: What are the benefits of implementing ERP in small enterprises?
RQ3: Which factors facilitate ERP implementation in small enterprises?
RQ4: What challenges do small enterprises face when implementing ERP?

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RQ5: Do ERP systems facilitate growth of small enterprises?

The literature on ERP is rich in references dealing with ERP implementation in developed countries and in large and medium sized enterprises. However, not much evidence is available regarding ERP implementation in developing countries and especially in small enterprises. Previous research (e.g. Al-Mashari *et al*., 2006) identified challenges when implementing ERP in developing countries. By presenting results of a case study on ERP implementation in a small enterprise in Croatia, this paper represents a contribution in this regard.

Implementing ERP: benefits and challenges

Enterprise Resource Planning is a transaction based business management system. It includes many applications such as material requirement and production planning; maintenance; distribution, logistics and sales management; asset management; quality management; human resource management (e.g. personnel management, skill and competence management), customer relationship management; data control in terms of centralization of administrative activities (e.g. billing, cost management and financial accounting analysis); allocation of resources, tasks and responsibilities across different positions and locations etc. (Siriginidi, 2000; Boykin, 2001; Hitt *et al*., 2002;). ERP provides real-time information originating in various departments and units and consolidated in one database. By integrating data-based business processes, ERP facilitates managerial decision process. ERP database can be considered an organizational knowledge repository. That is why implementation of ERP contributes to the decrease of risk of organizational knowledge loss, especially in cloud computing.

ERP systems have been first implemented in capital-intensive industries such as manufacturing, construction, aerospace and defense, and recently also in sectors such as hotel management, telecommunications, insurance, retail, finance, health care and even education (Shehab *et al*., 2004). ERP has been found to improve efficiency, especially by reducing operation and inventory costs and manufacturing lead times, reduce customer response time and improve customer loyalty, as well as improve the ability to manage enterprise stakeholders, resulting in improvements in profitability (Goodpasture, 1995; Brakely, 1999; Park and Park, 2015). In some cases, ERP has enabled reductions in inventories in manufacturing by up to 35% (Gupta, 2000), reduction of lead time by 60%, increase of inventory turn-over by 30%, reduction in cycle time by 80%, and a target of 99% on-time shipments (Shehab, 2004). ERP implementation has also been known to cause significant problems. It was reported that the number of cases in which it resulted in failure ranges from 40% to 70%, sometimes even higher (Sivunen, 2005; Chang *et al*., 2008; Kwahk and Ahn, 2010). ERP projects have also been found to exceed budgets (Adam and O'Doherty, 2000) and significantly increase implementation time (Scott and Vessey, 2002). That is why implementation of ERP systems has led many companies to bankruptcy (Markus *et al*., 2000; Chang *et al*., 2008). The main reasons are twofold: problems that emerge in later stages of the implementation process and an initial decline in productivity (Umble *et al*., 2003). Park and Park (2015) also found a decrease in efficiency and profitability during the first and second year after ERP implementation. Negative implications of introducing ERP prompted authors and practitioners to question the justification of its implementation.

It is interesting to note that Huang *et al*. (2009) found that there are differences in introducing ERP relative to the firm size. They found that big firms improve their business processes through process efficiency and financial performance, medium-sized firms raise operating income only in the first five years, while small firms show no improvement. However, implementation and usage of ERP systems has made them a market entry condition for many SMEs. The reason could be found in the fact that SMEs are often part of a larger value creation process and are therefore dependent on connectivity to larger systems. For that reason, many SMEs are often forced to implement ERP systems. In addition, large companies often refuse to do business with companies that have incompatible ERP systems. Many large companies urge their smaller partners to implement ERP systems to improve the level of efficiency and productivity, which could be reflected in lower costs and prices. ERP serves as a link to external stakeholders and contributes to the integration of divergent stakeholder perspectives. That is why management of SMEs should consider implementing IT platforms that are compatible with their partners' systems, which could contribute to the sustainability of the partnership.

Implementation of ERP systems is more challenging for SMEs than for larger systems. It has been estimated that implementation of ERP systems costs $300-500 million for large corporations and tens of millions for medium sized companies (Mabert *et al*., 2001). Challenges for SMEs also include requirements regarding data storage, networking and training (Shehab, 2004) that many find hard to provide. In addition, companies have been found to spend between three and seven times more money on ERP implementation relative to the purchase of software license (Scheer and Habermann, 2000). Managers must also foresee hidden costs such as initial losses in

productivity due to implementation anxiety, lack of skills, and costs of upgrading the system. Implementation projects are very time consuming. Installation can take between one to three months, while benefits have been found to accrue in 31 months on average (O'Leary, 2000). Van Everdingen *et al*. (2000) identified that European SMEs especially value short implementation time and user-friendliness, which can reduce training costs and contribute to faster full implementation of the system. Since the majority of large companies have already adopted ERP platforms, vendors have focused more on SMEs by offering ERP systems that are designed to suit their needs. That trend has resulted in ERP reference models based on identified best practices. By implementing ERP designed according to best practices, SMEs can compare their current business operations to best practices and redesign them by implementing ERP. For SMEs that means the process of ERP implementation includes a knowledge transfer perspective (Lee and Lee, 2000). Because of the reasons stated above, the decision whether or not to implement ERP systems even in SMEs is no longer a subject of debate.

Implementation of ERP in Croatian SMEs resembles world trends. SMEs in Croatia often lack financial but also human resources and time to implement complex ERP systems. Cost is a huge demotivator because ERP implementation budgets are often exceeded, up to 180 per cent on average. That is why vendors are forced to offer discounts and facilitate the implementation process to reduce implementation time, which is estimated from 1.5 to two years. Regarding ERP implementation, SMEs prove to be a greater challenge than larger companies not only because of resource and time constraints, but also due to the fact that their business processes are often poorly defined. That is why it is not always clear what tasks ERP systems are supposed to perform and in which direction the business is going to expand. To overcome the problem of possible future software limitations, vendors suggest implementing solutions that encompass as many processes as possible, which includes forecasting future development. For SMEs, this process is very difficult and highly unpredictable. In addition, SMEs often lack personnel that could be available and committed only to ERP implementation. Their focus is on growth perspectives and all resources are committed to business expansion. To reduce costs and enable increased customization, vendors offer cloud computing, which reduces the need to acquire advanced hardware and hire technical personnel, reduces implementation and upgrading costs, and increases availability and data security.

On the sample of 30 small to medium-sized manufacturing enterprises, Šimunović *et al*. (2013) found that 90% of them used ERP systems, out of which 81% implemented a specially designed modular system. For the majority of respondents (89%) ERP systems shortened operation times. Even though training was organized in 96% of cases, it was rated unsatisfactorily by 46% of surveyed companies. However, the rest of the sample declared that training was "planned and executed perfectly". Employees were generally in favor of implementing ERP. Only 24% of respondents reported that their employees resisted implementation. Cost tracking was reported as the most important advantage of implementing ERP, followed by time savings and improved options for data analysis and reporting, which is important for long-term planning. Costs, long implementation time, data integration and testing were cited as the most important disadvantages. The failure rate was low probably because 90% of respondents rated their IT and ERP knowledge as "excellent" or "very good". However, in a few companies in which ERP implementation failed the reasons cited were inadequate education of employees, poor adaptation to existing business processes and technical difficulties. It is interesting to note that despite excellent results, only 46% of respondents stated that ERP fulfilled their expectations. It is also important that the number of small enterprises in the sample was small, so the results predominantly refer to companies with a larger number of employees.

Case study

Research methodology

This study is based on the interpretative method of research. Epistemologically, the study of ERP systems, especially their implementation and usage, requires the exploration of the context, social interactions and processes (Newell, 2003). We adopted a case study approach, which enabled us to gain information regarding subjective yet contextual interpretation of events surrounding the adoption of the ERP system in the surveyed enterprise. Case studies have been the most frequently used research method when studying ERP implementation (Schlichter and Kraemmergaard, 2010). Case study methodology is very popular because of the ability to obtain a wide variety of detailed information (Yin, 1993), especially in the area of operations management. Case study methodology offers the ability to ask follow-up questions as well as to detect relations and causalities between variables. By performing an interpretative and exploratory case study, out attempt was to build rather than test theory.

Data was collected from a small enterprise in Croatia - "Alea kartoni", predominantly a manufacturing company producing cardboard packaging that has implemented ERP system in 2016. Enterprise manager did not insist on anonymity and gave us the permission to reveal the name of the company. In this case study, a single informant was chosen. However, the suitability of the informant was carefully examined. We followed the suggestion by Huber and Powere (1985) who noted that the person most knowledgeable about the issue of interest should be identified in cases where a single informant per organization is questioned. In this case, it was the enterprise manager, who was most knowledgeable of the process of implementing ERP, its outcomes and key success factors due to his direct involvement in the process. We believe that the choice of this informant mitigated possible shortcomings of the single-informant source of data. Interviewing a single informant raises doubts of personal bias that could distort findings. However, companies are very unwilling to disclose business sensitive information to outsiders so this approach was used to enable access to a larger amount of data. In addition, the use of single source case studies is well represented and accepted in previous research (Eisenhardt, 1989).

The questionnaire was designed on the basis of a thorough literature review. It was originally drafted in English and then translated into Croatian to conduct the survey. A colleague was asked to translate the questionnaire from Croatian back to English to check for consistency of meaning, which was established by comparing the two versions. The survey questionnaire consisted of 115 questions, out of which one was a complex question that consisted of 13 sub questions. 67 questions were multiple-choice questions. 29 questions required the respondent to indicate the degree of agreement with questionnaire items on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Nine question asked for further clarification. The rest of the questions were open questions requiring the respondent to answer specific questions such as "What is your position in the company?", "In which year did you implement ERP?", "What was your role in the implementation process?" etc. The company was chosen randomly from the sample of Croatian SMEs. An informational letter stating the purpose of the research and ensuring confidentiality was sent to the informant in advance to solicit participation.

Multiple methods were used to collect data. The authors first engaged in on-site observation, then submitted a survey questionnaire to the key respondent and ultimately engaged in ongoing open-ended interviews. That means that the inductive approach was used to get a full picture of the implementation process in the surveyed company. Interviews were conducted by both authors at the company site. Interviews were not recorded because the informant was uncomfortable. Less formal surrounding was much more suitable in gathering useful data. However, research notes were taken during on-site observations and during interviews. Notes have been taken by both researchers and later compared to improve understanding and accuracy of the presented data. The purpose of the survey questionnaire and subsequent interviews was to identify key issues of concern when implementing ERP systems in a small enterprise as well as its results.

Research framework

Besides general information, this research focused on three key areas: the process of ERP implementation, its outcomes (desired vs. achieved) and success factors. In this paper, ERP implementation was examined as a change management project. Change management supported by effective project management has also been identified as important by Nah *et al*. (2011) and Motwani *et al*. (2002). Preparation phase is key to successful ERP implementation. It refers to identifying goals and desired outcomes, which enhances motivation for change. When a small enterprise is introducing ERP, it is important that established business assumptions and processes are examined prior to their automatization and integration. That is why situational analysis is the starting point, followed by the analysis of technical requirements. Preparation phase ends with the implementation plan, which specifies expected benefits, costs and risks, order of implementing activities, timelines, necessary resources, and measurable outcomes. Project leader and team members are identified as well.

ERP implementation phase should proceed in two directions: process redesign and implementation of platform requirements (hardware, software and network requirements). These two aspects of the implementation process can occur simultaneously or separately. Implementing ERP without prior efforts in BPR can cause failures. Wood and Caldas (2001) found that that the majority of companies (71 per cent) have conducted BPR prior to investing in ERP or the two projects have been conducted simultaneously. Implementation process is followed by intensive training. Training has been identified as a factor that often determines the implementation success or failure (Al-Mashari, 2002; Arnold, 2006). Users should be educated to understand data flow in the value creation process. Low level of expertize can hinder functionality of the whole system. Project leaders should stimulate exchange of information and knowledge between users. Knowledge sharing can help minimize fear, increase familiarity with the system and improve user confidence. In this phase, the implemented model should be thoroughly tested with real data, under full data load. Rigorous testing has been found to significantly affect successful ERP implementation and usage (Maguire, 2004).

In this research, management support and effective communication have been identified as key success factors when implementing ERP in small enterprises, whose importance is significant in all phases of the ERP implementation. Management support has also been identified as the important factor in previous research (e.g. Nah *et al*., 2011). Another factor identified as important in implementing ERP is effective communication. Open communication has also been identified as important by Sarker and Lee (2000). It enables knowledge sharing, which increases individual and organizational learning and knowledge base. Effective communication with key external stakeholders (consultants included) is also considered important for small enterprises whose survival depends on their connectivity to larger systems.

By implementing ERP, companies wish to achieve various results. The key desired results are improved efficiency, productivity, effectiveness and bottom line. These benefits stem from optimizations in inventory management, reductions in working capital, improvements in resource utilization, sales management, customer relations and response time, which enables companies to increase delivery speed and reduce errors (Chen, 2001). The system can also enable accurate tracking of customer behavior, which can prompt interventions to improve their satisfaction and loyalty. Benefits of implementing ERP systems can be summarized as improvements in operative and strategic decision making due to availability of accurate real-time information. By gaining access to information, authority to make decisions can be delegated to workers. Availability of information can also enable employee empowerment (Davenport, 1998), leading to an increase in motivation. Implementation of ERP systems can also be viewed as a learning process on the individual and organizational level. An organization can engage in double-loop organizational learning when new goals, business assumptions and routines emerge (Argyris and Schon, 1978). In case the processes are automated by performing small adjustments based on the existing knowledge, an organization is undergoing single-loop organizational learning. All these aspects of business performance have been examined for enterprise in question.

Results

The initiative to introduce ERP in the surveyed company came from both the manager and the consultant. The company in question is a family business in which the father shared the information and opinion with his son, which resulted in his decision to purchase the system. Two major reasons which prompted ERP implementation were the desire to improve integration of business operations and increase customer satisfaction by reducing response time to their needs. The basic idea before implementing the system was that the system would automate and integrate existing processes within one system and hence increase their speed. As suggested by Francalanci (2001), the implementation project size was measured in terms of the number of modules and sub-modules implemented, while the complexity of the project was defined in terms of users involved and the company size. The surveyed enterprise was predominantly a manufacturing company so the implemented modules were Production planning module, Material management module, Plan maintenance module, Sales module, Finance module (including Cost module, Funds flow, Financial control, AR Customer management and AP Invoice receipt). The project was not complex from the standpoint of users – only two users (the manager and one employee) are currently using the system by monitoring operations and performing analyses. Other employees have limited contact with program options such as work orders and bills of lading. In the surveyed enterprise, the implementation budget has not been exceeded. The overall satisfaction of both management and employees has been rated as “extremely satisfied”.

The informant stressed the importance of planning as the key factor leading to successful implementation of ERP. However, the degree of planning was low. The surveyed enterprise did not conduct a thorough situational analysis prior to introducing the system. Still, the desired goals have been determined. In that process, the help of vendors was very beneficial. The vendors introduced the management to all modules and options of the system, and helped them decide which modules to implement. Their knowledge and experience proved invaluable in that process. It is interesting to note that the activities necessary to implement the system have not been identified. Implementation period was also not defined, risks were not estimated and costs have not been specified. However, management did plan the necessary resources. In the preparation phase, management did not conduct business process analysis or map information flows. That is why it is not surprising that in the planning phase it was not determined that business process redesign was necessary. Management decided to take the “go with the flow” approach and adjust along the way. Management was very convinced about future benefits of implementing ERP, so impediments to its introduction were not identified and the benefits of using the system have not been clarified to employees. Training budget was also not identified. However, considering the fact that management (a single person) is the key user, this finding is not surprising. The manager was the only person

responsible for introducing the system and relied on software support for help. That is why not even technical requirements were identified by management.

In the implementation phase it was determined that business process redesign was necessary. It was therefore conducted along with implementing the system. Management was generally satisfied with the outcome of the process redesign. In this phase, data migration plan was established to ensure smooth data transition from the old system to the new. The process of implementing the system lasted for a week and was followed by testing and optimization. After the system was introduced, employee training program started and lasted for a month. Education consisted of three programs and was conducted until all problems were resolved. Employees were very good at learning how to operate the system (rated four on a five-point Likert scale). Employees were encouraged to share information and knowledge to improve the process of learning. There was always a possibility for them to ask for help. No problems in the education process have occurred that deserved special attention. However, the knowledge gained in the training process was rated low (two on a five-point Likert scale). The reason could be that more emphasis should have been placed on education. This finding is consistent with the fact that system is currently not being used to the full extent (rated three on a five-point Likert scale). In the process of learning, employees were not stimulated by any benefits.

Managerial support was considered extremely important (rated five on a five-point Likert scale). It was estimated that management ensured an adequate amount of resources in every phase of the implementation process (rated five on a five-point Likert scale). Self-assessment of the manager as the project leader was rated as excellent (rated five on a five-point Likert scale). This response can be related to the degree of satisfaction of the system, which was rated "extremely satisfied". Managerial support was especially important in the preparation phase. The importance of communication was also great (rated five on a five-point Likert scale). Management estimated that the quality of communication during the implementation process was excellent (rated five on a five-point Likert scale). During the implementation process, management did not establish communication channels with external stakeholders. The reason lies in the fact that the stablished system represents best practice which is in accordance with the processes of other stakeholders.

It is especially important to determine implementation outcomes in the surveyed enterprise. ERP contributed to the reduction of costs, though only to some extent (rated three on a five-point Likert scale). In more detail, the enterprise managed to reduce inventory costs (stock of raw material and finished goods). The costs of personnel have also been reduced. Productivity improved slightly (rated two on a five-point Likert scale). The most important reason identified as a cause of productivity improvement was faster communication with the production department through working orders that are streamlined directly to them. The system did not improve relationships with suppliers or customers whose satisfaction did not improve. Customer satisfaction relative to price was also not improved because the price is significantly determined by the price of raw material (up to 90%). On the other hand, the system improved satisfaction of workers, though not drastically (rated three on a five-point Likert scale). The reason for increased employee satisfaction was twofold. First, employees were more satisfied because of the availability of real time and accurate information. Second, the system enabled a higher level of delegation of authority to employees to make decisions on the operative level. Considering the fact that the surveyed company was small, the system did not contribute to employee empowerment.

Overall, implementation of ERP improved quality of decision making from the operative and strategic perspective. On the operative level, the quality of decision-making improved regarding material requirements, the type and quantity of inventories and the need for workforce. The system enabled improvements in strategic decision-making because it helped the manager make a decision to target a new market. Considering the process of organizational learning, it was identified that the implementation of ERP resulted in single-loop learning. It enabled correction of errors in the existing processes based on the existing knowledge. The occurrence of single-loop learning is visible from the fact that the enterprise engaged in business process reengineering. In addition, the respondent identified adjustments and improvements of the existing system as the most important outcome of implementing ERP. It can be concluded that the system produced benefits through single-loop organizational learning, which further enabled automation of processes and tangible benefits in terms of improved efficiency and productivity. Double-loop learning did not occur. The value creation process of the surveyed company is of a limited scope with established simple product portfolio and targeted customers, which was profitable even before introducing ERP. That is why it was not necessary to change established business assumptions, policies, goals and other elements of the business model. Since the elements of the business model would remain the same, it is not surprising that it has been estimated that the system would not significantly influence growth and development potentials of the surveyed company (rated two on a five-point Likert scale). It is interesting to note that despite the fact that the manager values the ERP database as a valuable knowledge repository, he has no fear that the knowledge would be misused or stolen.

Conclusion

This study was based on the interpretative method of research. It provided answers to the research questions regarding the nature of the ERP implementation process in a small enterprise based on the developed research framework along with its benefits. It also elucidated challenges which small enterprises face when implementing ERP as well as its success factors. In the surveyed small enterprise, ERP enabled upgrading of their business system and processes and ensured compatibility with larger systems. Regarding benefits, the system enabled real time and accurate information, contributing to quicker and more accurate decision-making, especially on the operative level, leading to improvements in both productivity and efficiency. The implementation process in the surveyed company confirmed the assumption regarding the necessity of good planning. Considering the fact that management did not engage in thorough planning, it is not surprising that improvisation was widely used (rated five on a five-point Likert scale). However, management did not encounter any unforeseen events or circumstances due to good vendor support. It can be concluded that vendor support is of crucial importance when implementing ERP systems, especially in small enterprises that lack knowledge and resources that could be dedicated to the implementation process, including thorough planning. That is especially important due to the fact that in small enterprises all resources are dedicated to current operations and growth possibilities. Vendor support contributed to the fact that the project was not rated uncertain despite the lack of planning. In addition, with the support from vendors, the enterprise managed to redesign their business processes according to ERP requirements simultaneously with the introduction of the system.

Management support was identified as crucial. Managerial support in the implementation process was excellent and especially evident in the preparation phase. It can be attributed to the manager's strong personal conviction of the usefulness of the system. It was further strengthened by the vendor support and their convincing expertise and experience as well as their dedication and commitment to the implementation process. It can be concluded that in this case, the introduction of ERP was prompted by endogenous factors, mostly strong management conviction regarding expected benefits and not exogenous factors as found by Buonanno *et al*. (2005). Support is impossible without good communication, which was also identified as a factor of great importance. Its relevance and quality could be regarded as a derivative from strong commitment on the part of management and vendors.

In the surveyed company, ERP system produced expected benefits, especially regarding better integration of internal processes, costs reductions and improved productivity. The necessity to redesign business processes was detected, which produced further benefits through the process of single-loop organizational learning. Considering the fact that the company invested ample effort to manage ERP implementation process, the project was completely justified and produced significant personal satisfaction on the part of both management and employees. Based on the presented findings, it can be concluded that implementation of ERP systems represents a prerequisite for successful business even for small enterprises but not necessarily a significant source of competitive advantage, at least not in the long run. Its most important benefits can be attributed to improved and faster decision-making based on real time and accurate information. Fast decision-making, especially regarding customer requirements and material procurement is a factor that could mean death or survival for small enterprises. That is why it can be concluded that even small enterprises should seriously consider investing in ERP systems when they reach the stage of stable revenue streams and cash flow. However, the results of this study are based on a single case study and should not be generalizable. That is why further research based on the proposed research model is suggested. Further research scrutiny of the aspects of the proposed research framework is also suggested. It is considered beneficial that the proposed research framework is also tested on the larger sample of both SMEs and large companies.

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