

A qualitative study to identify the factors that influence the acquisition of Enterprise Resource Planning Systems by Small and Medium Enterprises

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Abstract

Enterprise Systems (ES) have been known to enable strategic decision-making in addition to improving operational efficiency. Large enterprises the world over have benefitted from these systems. Over the last several years, there has been an increase in the number of ESs implementations in Small and Medium Enterprises (SME). This is due to several factors including that the large enterprise segment is saturated with most companies having already implemented an ES.

An ES acquisition is a strategic decision that can significantly affect future competitiveness and performance of a SME. While it is well documented that large enterprises use a structured approach to ERP evaluation and selection, the same is not true in the case of SMEs. In this paper, the author elucidates the factors that influence the acquisition decision. This is based on the insights gained from a study carried out at 6 SMEs who have acquired an ES.

Keywords: *ERP (Enterprise Resource Planning) Software, SMEs (Small and Medium Enterprises), Information System Selection, Influencing Factors*

Introduction

Enterprise Systems (ES) are defined as large-scale, packaged, application software systems that can be used to streamline and integrate the business processes of an organization and considerably improve information and knowledge levels within the organization as well as with its customers and suppliers (Davenport, 2000). Today, ES refers to a number of systems like Enterprise Resource Planning (ERP), Supply Chain Management (SCM), Customer Relationship Management (CRM) and so on. Implementing any of these systems is very challenging and requires a massive investment in time and money.

An ERP system is an Information System (IS) that supports the functional units of an enterprise like finance and accounting, HR, marketing and sales, manufacturing and logistics (Sadagopan, 1999). They provide for seamless integration of all the information flowing through an organization (Davenport, 1998), and are considered as the IT backbone of choice for large firms. The ability of these systems to provide an integrated solution to meet the information processing needs of organizations has persuaded practitioners and managers of their need for not only large multinationals but also for Small and Medium Enterprises (SMEs) (Everdingen et al., 2000).

Most large enterprises, the world over, have either implemented an ERP system or are in the process of doing

so. Thus, for ERP vendors, the large enterprise segment has reached a near saturation. This has caused them to shift their focus to the SME segment. The market for fresh ERP licenses sold each year in India was \$54.2 million in 2006 and was expected to touch \$80 million by end 2008 and reach almost \$185 million by 2013 (Frost and Sullivan Report, 2007). Of this, more than half the demand was expected to come from SMEs, which was predicted to continue to drive the market in the future. While the market for fresh ERP licenses has slowed down, the SME segment is the main driver. Sale of ERP in the SME segment has increased due to many factors including the fact that today prices of hardware have reduced and the need for integrating systems between organizations has gone up (Gable and Stewart, 1999).

Acquiring ERP is a very challenging task for large and small companies alike. Though ERP implementations in SMEs have increased, the acquisition decision is not accorded the importance due to it as SMEs rarely use formal business strategies or take time to study strategic IT choices (Ravarini et al., 2000, Singhal, 2016). Due to the organizational specificity of small organizations having fewer people and not being knowledgeable about ERP systems, they do not approach ERP acquisition the way large organizations do (Bernroider and Koch, 2001).

The awareness for ERP systems amongst SMEs is low (Tiwari, 2014) because of which they are unable to make an informed decision. Some SMEs acquire ERP because their competitor has done so while others approach the ERP decision as if it were yet another software system. Many of them even

believe that all ERP packages are alike. Because of this, SMEs do not undertake the planning and the preparation necessary for a project of such high strategic importance. They may end up choosing a system that is often unable to support business processes (Ravarini et al., 2000), leading to dissatisfaction amongst the employees among other problems. Thus, most ERP decisions are taken without proper consideration and without aligning ERP with business goals.

The objective of this study is to identify the factors that influence the ERP acquisition decision at SMEs. In this paper, the author reveals the factors that influenced the ERP acquisition decision at 6 SMEs. These factors were identified as a result of literature reviewed. The presence of these factors was then ascertained, via a multiple case study, at 6 SMEs. This paper is organized as follows. In the next section, the literature review is presented. After this, the research methodology is described and the cases considered for this study are presented. The findings and the discussion are presented next. The paper ends with the conclusions and avenues for future research.

Literature review

Majority of the research conducted in the area of ERP is focused on implementation and the problems and issues surrounding it (Esteves and Pastor, 2001; Verville, 2000; Sykes et al., 2014). A large amount of research has gone into determining the critical success factors for implementation of an ERP system (Holland and Light, 1999; Akkermans, H. and Van Helden, K., 2000; Nah et al., 2001; Umble et al.,

2003; Loh and Koh, 2004; Dowlatshahi, 2005;). Majority of these studies have focused on large enterprises.

Since there is an increase in the number of implementations at SMEs, a large number of researchers have been studying implementations at SMEs (Everdingen et al., 2000; Haddara and Zach, 2011; Bernroider and Koch, 2001; Verville and Halington, 2003; Baki and Cakar, 2005; Teltumbde, 2000; Wang and Wei, 2004). These studies focus on buying and implementing ERP software with care, in order to ensure a better understanding of the buying process and reduce the risk and uncertainty associated with the acquisition of ERP systems by SMEs. Majority of these studies have been undertaken in the European context.

There are studies that attempted to find the factors influencing Information Technology (IT) adoption in SMEs. Premkumar and Roberts (2000) conducted a study on IT adoption at small businesses in rural communities in the US and found the influencing factors to be relative advantage, top management support, organizational size, external pressure, and competitive pressure. A similar study (Mehrtens, 2001) conducted to determine internet adoption by small firms revealed that perceived benefits, organizational readiness, and external pressure all significantly influenced Internet adoption.

There are a few studies on the issue of ERP acquisition at SMEs (Ravarini et al., 2000; Xavier et al., 2000; Bernroider and Koch, 2001; Raymond et al., 2007; Themistocleous et al., 2001; Verville and Halington, 2003; Baki and Cakar, 2005; Verville et al., 2005; Ziaee et al., 2006; Deep et al., 2008;

Palanisamy et al., 2010). Verville and Halingten (2003) defined the ERP acquisition process as a set of interrelated activities that begins with the specific commitment to the acquisition task. It includes gathering information on vendors, sending RFPs (request for proposals), evaluating their proposals, negotiating and signing contracts with them.

The studies on ERP acquisition refer to the factors that influence the ERP acquisition decision. Verville and Halingten (2002) classified the factors into 4 categories namely, environmental, organizational, interpersonal and individual. Themistocleous et al. (2001) revealed that SMEs are influenced by external factors like competitive pressure or “opportunity of the moment” than business related factors.

Everdingen et al. (2000) did a study on ERP adoption by European midsize companies. From this study, the following facts emerged: European midsize companies focus more on product characteristics and less on supplier characteristics. For them, the vendor being the market leader or having a superior corporate image does not matter. Thus, the market position of the vendor does not influence the ERP decision. Short implementation times and lower costs are very important to SMEs (Everdingen et al., 2000) due to the strict financial limitations and hence they look for cheaper solutions (Ravarini et al., 2000).

Bernroider and Koch (2001) carried out an empirical study concerning the differences in ERP system selection by large and midsize organizations. This study revealed that organization size had a significant influence on ERP package

selected. SAP R/3 was selected by large organizations while SMEs often chose products that were priced lower. Another finding of the study was the importance given to adaptability and flexibility of software by SMEs, which indicates their need to retain processes unique to their business. Also, in this study SMEs considered the market position of vendor as important to their choice of ERP system.

More recently, considering that cloud computing is being increasingly adopted by SMEs, researchers have tried to understand the factors that influence the adoption of cloud computing. Tehrani et al. (2014) investigated the environmental, organizational, human and technological factors that influence the adoption. They reported that competitive pressure, decision maker’s knowledge of the cloud, low complexity and low cost influenced adoption. But the adoption of ERP on the cloud was found to be low (Allart, 2015).

From the literature reviewed, several factors were found to influence the decision to acquire an ERP system. They were classified as internal (endogenous) and external (exogenous) factors as shown in table 1 below.

Table 1: Influencing Factors from Literature Reviewed

Endogenous Factors	Exogenous Factors
Implementation cost	External Pressure
Implementation time	Year 2000 Issue
Organizational size	Market position of the vendor
Perceived benefits	Competitive Pressure
Top Management Support	Investor Pressure
CEO’s Knowledge	Product Features
IT Head’s Knowledge	Relationship with the vendor

Around the year 2000, ERP acquisition was primarily influenced by an external factor namely, the year 2000 issue. Since this factor is no longer relevant, it was not considered for the study.

Research methodology

For this study, secondary information was collected from various sources like research papers published in peer-reviewed journals, articles in newspapers, etc. To ascertain the influencing factors identified via the literature reviewed, a multiple-case study methodology was adopted. Six SMEs who had taken the ERP decision and had selected an ERP vendor and package were selected and requested to participate in the study. This approach gave room for investigating how these SMEs went about their ERP selection decision.

The companies selected are SMEs in *Southern India* and the criteria for selection are:

- A turnover in the range of Rs. 10 Crores to Rs. 300 Crores.
- A New acquisition
- Selection of a packaged ERP system (not a custom built one) implemented on premise (not on the cloud).

The reason why only 6 SMEs were chosen was due to the complexities involved in the acquisition process, the large amount of time required to gather information from each SME and personal financial constraints.

At these six SMEs, the author conducted in-depth interviews with CEOs, Managing Directors, IT personnel, General Managers and consultants, all of who played an important role in the ERP acquisition decision. This research methodology has been used successfully in a number of earlier studies (Robey and Sahay, 1996; Verville and Halington, 2002).

Open-ended questions were used during the interview in order to provide for a deeper understanding of the procedure adopted while selecting an ERP system. This allowed for flexibility in the interview process and allowed to preserve the exploratory nature of the study. The questions pertained to why the SME had decided to implement an ERP system, what factors did they consider to select an ERP package and which factor influenced the purchase decision the most. The interviews were transcribed and verified by the SMEs to ensure accuracy in data collection. Further clarifications were sought via e-mail/ phone and the process of data collection was completed.

The cases

The profile of the 6 SMEs chosen for the study is described in table 2 below. (For the sake of confidentiality, the names of the companies have been masked.)

Table 2: Profiles of Companies Chosen for the Study

Name of the Company	Profile and Background
Alpha	<p><i>Turnover: Rs. 50 Crores; Headcount:400</i> This Company is a manufacturer and supplier of LPG and CNG conversion kits for automobiles and enjoys a market share of nearly 70% in India. The company has manufacturing plants in 6 different cities. They source the different components they need from nearly 60 suppliers. Alpha is recognized by several OEMs and receives export orders mainly from America, Asia and Europe.</p>
Beta	<p><i>Turnover: Rs. 163 crores; Headcount:450</i> This Company is a manufacturer and exporter of quality incense. With 6 brands and 86 different combinations offered in them, they meet the needs of customers worldwide. Thus, they have a strong presence on the domestic front and export to over 40 countries. With a current turnover of Rs. 163 crores, the company is set to reach a target of Rs. 300 crores by 2010. They have a current market share of 30%.</p>

Gamma	<i>Turnover: Rs. 150 crores; Headcount:500</i> This Company is a leading electronics manufacturing services (EMS) company in India. They deliver complete end-to-end manufacturing solutions to technology companies around the world. The company is a part of the global EMS alliance that aims at delivering high quality electronic components at minimal costs and is counted amongst the top three homegrown EMS companies in India.
Omega	<i>Turnover: Rs. 12 crores; Headcount:280</i> Omega is manufacturer of forgings for a wide range of specifications. This Company has a current turnover of Rs. 12 crores with a projected turnover of Rs. 100 crores by the year end. They have manufacturing plants in two locations and a large product line. They have clients both in India and abroad.
Eta	<i>Turnover: Rs. 10 crores; Headcount: 200</i> This company, a family owned business, is a manufacturer of good quality stationery for offices, students and for personal use. Their products are said to be innovative and stylish to suit modern day needs and meet international quality standards. They cater to the domestic market.
Kappa	<i>Turnover: Rs. 100 crores; Headcount: 50</i> Kappa is into the construction business and develops commercial spaces, interiors and builds residential apartments. They have offices in 10 different cities with a current turnover of Rs. 100 crores.

Findings from the study

In the six companies studied, various influencing factors were observed. They are presented below.

Alpha

Alpha was using Tally, an accounting software, and a proprietary software to meet their information needs. Information was spread across several different locations and hence was not available in real time. It was also difficult to track movement of materials and to know what was happening at the different locations. It was not possible to rely on the data obtained from these different systems. Hence, they decided to opt for an ERP solution. This decision was influenced by the CEO's knowledge as he had heard about ERP systems from his peers and felt it would be the right solution to meet their needs.

The CEO invited three vendors of his choice to present the features of their ERP packages. Since they did not have a strong IT team, they relied on the ERP vendors to tell them all they needed to know about the ERP system. Based on the presentations made, of the three packages, one was found to be suitable. But, it had to be rejected, as it was very expensive and the second best was chosen. Thus, cost of the ERP package was found to influence the final purchase decision.

Beta

At Beta, most functions are carried out in an ad-hoc manner. They used Tally, an accounting software, Microsoft Excel and

Management Information Systems (MIS) to meet each department's needs. Data had to be entered in more than one location resulting in duplication of efforts and the resultant data was unreliable. The systems were all built keeping individual department's needs in mind and hence could not be integrated as they were all built differently.

Beta had a strong IT team. This team recommended that an ERP system was the need of the hour. The top management studied the proposal and gave their support to take this project forward. It was important to choose a system that would be easy to use and it was also necessary to ensure that the existing data could be migrated to the new system with ease. The IT Head's knowledge influenced the choice of ERP. The final choice was based on, among other factors, the package that had the least cost of implementation.

Gamma

Gamma was using an ERP earlier. So they were not new to an ERP system. Two years after implementing an ERP system, the requirements of the organization outgrew the capabilities of the current ERP system. It was not possible to integrate it with other software like the quote management system that came in later. Looking back, they felt that they had not considered the future growth and requirements of the company. They now wanted an ERP system that could support their growth.

Gamma was using an earlier ERP system, which was customized to suit their requirements. This ERP was not web-enabled and since the company wanted this feature,

their options were to either seek an upgrade from the existing vendor or call in a new vendor. They examined the market position and the number of customers for a few chosen vendors. The current vendor's market position and number of customers in the Indian context were not very encouraging. While Gamma was deciding which ERP to choose, their parent company took the decision out of their hands. The parent company had opted for a specific ERP and wanted the subsidiary to also use the same ERP. Thus, the ERP purchase decision was influenced by their parent company.

Omega

Omega had a custom-built software to meet the specific needs of the various departments in the organization. This was a stand-alone application that could not be interfaced with any other applications like Tally, which was used for accounting purposes. This resulted in islands of information, which ensured that information was never available when needed. They felt the need to increase transparency, empower users and disseminate information quickly. Their search led them to an ERP system.

Since Omega did not have a strong IT team, their knowledge about ERP was not very good. They decided to invite three vendors who were recommended by their peers. When these vendors were asked to make a presentation, only one vendor was able to give the client confidence on the basis of an implementation they had done at a competitor site. Here, the decision was taken based on the

vendor's past experience and knowledge of their industry. Yet another factor was the openness displayed by the vendor in answering all the queries of the client. This convinced Omega of the vendor's ability to see them through the implementation. Here is a case of the ERP decision being influenced primarily by the vendor and not so much by the product features.

Eta

Tally software was used for all the accounting needs of the organization. The problems they were facing were that of not knowing the exact status of production, and order fulfillment was almost always error prone. Many a time the information needed to take a decision was not available when needed. Since the company was on the growth path, they felt that they had to have a system that integrated the working of the various departments and allowed to manage orders more easily. Their search led them to an ERP system.

Eta did not have a strong IT team. They scouted the market for ERP software and found that they were all priced very high. At that time, they heard of the ERP system from Tally. The vendor had supplied Tally accounting software and he understood the company and its needs well. Also the ERP system from Tally was priced much lower than the other ERP vendors' packages. This gave the management team the confidence to entrust the vendor with the ERP implementation task. Thus, the comfort levels they enjoyed with the vendor influenced their ERP decision.

Kappa

Kappa had been using a mini-ERP from a local vendor, which they were promised would support their growth. They were also using MS-Projects and MS Excel. All these applications were working in isolation and could not be integrated. Since they were planning to grow exponentially in the next five years, they felt they needed a system that would support their growth. The CEO decided that ERP was a solution that would support their growth.

Based on their past experience, Kappa decided to consider the following factors to select an ERP system: ease of use, easy data migration, perceived benefits from ERP, vendor's market position and credentials. The CEO hired a consultant to help them in the decision. While Kappa invited three vendors and evaluated them on the parameters mentioned earlier, the consultant influenced the final purchase decision. Based on his expertise, he suggested an ERP system specifically meant for the construction industry. Kappa decided to choose the same ERP system.

Discussion

From this study, several factors were found to influence the ERP acquisition decision at SMEs. These factors have been summarized in table 3. The factor that had the most influence on the purchase decision is in bold.

Table 3: Summary of Influencing Factors

	Alpha	Beta	Gamma	Omega	Eta	Kappa
Endogenous Factors	CEO's Knowledge	IT Head's Knowledge	Parent Company's requirement	CEO's knowledge		CEO's knowledge
		Implementation cost				Perceived benefits
Exogenous Factors	Vendor's knowledge of our business	Ease of use	Market position of vendor	Vendor's knowledge	Vendor's knowledge	Consultant advice
		Easy data migration				Vendor credentials and knowledge
						Trust in the Vendor
	Cost of the ERP			Product features		Easy data migration

Majority of the SMEs (4 of them) focused more on the vendor characteristics and less on the product characteristics contrary to the findings of an earlier study by Everdingen et al. (2000). SMEs wanted a vendor who had good knowledge of their industry and line of business. One of the CEOs said, *“While selecting a package, we found that the vendor’s credentials gave us the confidence we needed. If they were well versed with our industry, we did not check on any additional details regarding the package or its features.”* The IT Head at another SME said, *“The trust we had on the vendor and the comfort levels we shared in our relationship, made us decide to go ahead with their ERP package.”* This clearly indicates that SMEs give more importance to the vendor and their knowledge and less importance to the package.

While the market position of the vendor was not considered to decide on an ERP, it was definitely used to eliminate some vendors from the consideration set as the market position was taken to indicate the financial stability and the support that a vendor can provide. Thus, the market position of the vendor did influence the ERP acquisition decision as reported by earlier studies by Bernroider and Koch (2001) and others.

It is necessary to notice that all six implementations are happening with vendors other than SAP, the market leader. The products from SAP are considered to be beyond the reach of SMEs. In one of the SMEs, though a package from SAP was found to be the right fit, it was not possible to acquire the same due to the cost of the package. Due to

their financial limitations, SMEs always look for cheaper solutions. This proves the finding of Bernroider and Koch (2001) that organizational size definitely influences the selection/adoption decision.

In three of the six SMEs, the CEO's knowledge determined the ERP chosen. The CEOs at these SMEs were tech savvy and were the key drivers for the ERP project. They influenced the purchase decision. Though they did not have much knowledge about the vendors or their packages, they knew that an ERP system could help them and went ahead with the decision. In one of the SMEs, a consultant's advice was sought. Based on his expertise, an ERP system was chosen. It is necessary to mention that most SMEs do not opt for consultant advice, as it is very expensive.

From this study, it is very evident, that all the 6 SMEs decided to adopt an ERP system driven by an internal need and not due to external pressure. The SMEs had experienced the need for an integrated information system to support their growth. They took the ERP adoption decision because they needed a system that would help them respond to the dynamic business scenario. None of them had taken the ERP adoption decision influenced by external factors like competitive pressure or investor pressure as was reported by many researchers (Mehrtens, 2001; Themistocleus et al., 2001).

Yet another fact that was ascertained by this study was that SMEs did not use any formal method to select an ERP. This is evidenced in each of the six companies from the way they chose an ERP system. None of the SMEs undertook a

requirement gathering exercise, which precedes an ERP system selection. Three of the SMEs used a semi-structured method and used certain parameters to judge the various ERP packages. This can be attributed to the following aspects:

- They had implemented an ERP system earlier
- They had some knowledge about ERP systems
- They had a strong IT team or someone who knew about ERP

Majority of the SMEs did not have an IT team or a person who was knowledgeable about ERP systems. They approached the ERP acquisition decision as they would in the case of procuring any software package. They did not consider their needs or evaluate how an ERP could meet them. This often times results in a system that meets but half of the company's requirements and results in dissatisfaction.

From the above discussion, it is possible to say that SMEs should:

- Adopt a structured approach to ERP acquisition.
- Align ERP with their business goals
- Consider both vendor and package features while deciding on an ERP package.

Vendors should consider lowering the cost of the on premise ERP package for SMEs. Price should not be a deterrent for SMEs. Though ERP is available on the cloud at a cheaper

cost, SMEs are not very keen on adopting it at present. Vendors could consider winning the confidence of the SMEs in this regard. SMEs wanted an ERP system that is easy to use and quick to implement. This again is an area that vendors need to pay attention to.

Conclusion

This paper brings forth the factors that influence the ERP decision. The study began by identifying the factors as reported in the literature and then examined the presence of these factors at six SMEs. It was found that vendor's knowledge of the industry in which the SME operated and the cost of the ERP had the most significant influence on the acquisition decision. The market position of the vendor did not have a major influence. It is necessary that SMEs adopt a structured approach to ERP acquisition and align ERP to their business goals. Their ERP acquisition has a long term impact on the organization. Hence, they need to pay greater attention to it.

Vendors should consider making their ERP packages easy to implement and use. Lowering the cost of the on premise ERP package for SMEs, would allow SMEs to adopt an ERP system that suits their requirement the best. While cloud based ERP solutions are cheaper, the SMEs are not very confident about adopting it. Vendors could try to understand the reasons for the same and address them.

Since this study considered only six SMEs, the results cannot be generalized to a larger population. Due to a small sample size, there may be several factors that were not

observed. This study will have to be extended to a larger sample in order to determine the additional influencing factors. It would also be interesting to learn how these factors could impact the implementation, positively or negatively.

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