THE LEVEL OF SATISFACTION WITH AN ERP SYSTEM IN RELATION TO THE DECISION MAKING PROCESS

Claudia van der Vorst*, *Dipl. Ing., MBA
University of Riga, Latvia and University of Applied Science Kufstein, Austria

Abstract

This paper investigates in the buying behavior of small and mid-size companies in Germany with a special focus on the decision making process, the buying process, in cases of purchasing information technology / ERP (Enterprise Resource Planning) systems.
Furthermore it will outline the connection of the decision making and buying process and the success of the implementation, reviewing critical success factors for the implementation of the ERP system. Especially for small and mid-size companies (SME) the decision to buy a specific software package will have significant consequences for all parts of the business in terms of business processes and costs. The paper will support hypotheses about the acquisition of an ERP system at SME companies. Success factors will be identified, prioritized and evaluated specifically for the requirements of the small and medium size companies.
Findings are that during the acquisition phase the entire company is expected to support the definition of requirements of the new system, the purchasing department has to be supported strongly by strategic guidelines of the top management, a business case needs to be prepared in the very beginning and the long term vision needs to be challenged with the capabilities of the new system. After a long implementation process and after go live none of the requirements are reviewed again nor measured to ensure this strategic investment was executed according to the defined expectations.

Keywords: Enterprise resource planning (ERP), sritical success factors (CSF), small and mid-size entities (SME), decision making, acquisition

Introduction

The selection, implementation and maintenance of standard ERP software like the high-end enterprise packages of e.g. SAP, Oracle and Microsoft constitute the commodity part of the business for big enterprises.

The area around the smaller and mid-size businesses is significantly different. A lot of small, mainly local IT companies are implementing a large number of different ERP solutions according to a similar number of different methods.

During the past years the number of larger entities buying and implementing new ERP systems has reached saturation points. They are currently rather consolidating existing systems and upgrading new releases. ERP developers are seeking for new potential markets among small and medium size companies (SME) (cf. Deep et al., 2008, p. 430). With the opening up of all economy SME companies are forced to adopt their business model and approach according to practices and software adopted by big companies (cf. Shehab et al., 2004 p. 359)

The business requirements for medium size companies are changing rapidly. Hence their need for a professional IT and ERP system support is higher than ever. A study (2005) of 550 companies showed that over 57%-70% of large companies are currently using ERP

systems but only 27% of SME companies (cf. Caruso, 2005). There is a significantly rising demand for ERP systems at mid-size companies. There was an additional feedback in the same study, claiming that 50% of the companies are planning to select a new or to modify the existing ERP system within the next 12-18 months. This study obtains more and more relevance in the current turbulent economic markets.

Literature Research

Decision Making

A review in literature shows that the subject "decision making" is exhaustive and especially "strategic decision making" is getting more and more popular in recent years. One aspect of decision making should be taken into further consideration - rational decision making addresses how a decision should be made rather than how decisions are made (Glenn and Simon, 1978), which is a very valuable aspect for the subject ERP selection. Given the study of strategic decision making is a conglomerate of all intellectual disciplines, this paper and it's research focuses on managerial decision making where Barnard and later theorists like James March, Herbert Simon and Henry Mintzberg laid the foundation for. To make good choices companies must be able to calculate and manage the risks (cf. Buchanan, 2006). Decision making is seen as a functional view driven by rational behaviour (cf. Melé, 2010).

Reviewing literature for the specific subject of IT / ERP decision making shows that IT /ERP selection (and implementation) is getting more and more popular in the recent years. Multiple cases have been analysed (cf. Verville et al. 2002) and many different approaches reviewed (cf. Verville et al. 2003, 2005).

The structure of a purchasing department or a structured process for acquisition, which are the specific needs for a mid-size buying organization and which information are required for long sustainable decision process in purchasing are not covered by scientists in much detail. The IT acquisition strategy should follow the company's overall business strategy, so core competencies, critical success factors, feasibility studies and further specific information should be aligned by lead managers and related acquisition and implementation methods understood (cf. Rahardjo, 2006).

The strategy and method are more related to the approach taken, the selection process itself usually follows a similar structure. The main difference between the execution of the process and its intensity depends mostly on the size of the company. According to the findings of a research study conducted by Infinedo (2007) organisational size is positively related to ERP success, due to some findings with respect to IT budget size, staff and department size.

To summarize it is important to point out that there are a lot of similarities for the execution of the acquisition process itself. For the purpose of this paper the process is taken as a multi stage process with reference to all mentioned authors. The 4, 5 and 6 stage processes usually cover the same activities just describing a different level of detail.

Success factors for a high degree of satisfaction

According to many researchers, more important than the process itself are the characteristics chosen to evaluate the ERP system. The best fit of these characteristics, its evaluation and impact on selection is the key to a measurable, successful implementation. The biggest challenge for the selection of information technology is the definition of all requirements for the expected solution. (cf. Schmitz et al., 2007, p.260).

Verville and Hallingten (2002) determined three distinct types of criteria for evaluation: vendor, functionality and technical. Vendor evaluation criteria included size, financial stability, and reputation of vendor etc., functional criteria dealt with the software features and included functionalities specific to front-end interfaces, user friendliness and so

on. Technical criteria dealt with the specifics of the system architecture, integration, performance, and security etc. (cf. Baki et al., 2005). Percin (2008) differentiates mainly criteria by system factors and vendor factors using the very specific ANP approach as the decision making process, stressing a pairwise comparison of the criteria. Shiau et al., (2009) are focussing on six specific criteria to analyse the decision behaviour and influence of CEO's. Six constructs are: investment decisions cost and benefit analysis, choice of appropriate technology, choice of vendor or brand and suitable innovation for the firm.

There are multiple studies containing literature comparison of the influencing characteristics for the ERP selection. Each list has a slightly different research background as well as complete different hypothesis as a basis. Shiau (Shiau et al. 2009) focuses with his list on measurable critical success factors to validate the characteristics of the ERP acquisition. Shehab (cf. Shehab et al. 2004) lists various papers to provide an overview of the characteristics used for SME and large companies. Rahardjo created a list of success factors and factors for failure (cf. Rahardjo, 2006). All his criteria for failure have been used but in a positive way as success factors, e.g. "lack of management capability" used as a success criteria "high management capability".

To sum it up, so far, research papers, cases and empirical studies covering the same detailed aspect have not been found but the topic seems highly relevant in the rising ERP/IT business environment. Hence, the current state of research for this topic is very young and there is potential to continue in various aligned areas.

Hypothesis and Research Method and Design

Main Hypothesis and Overall Research Question

Researchers have analyzed considerably extensive the implementation of ERP systems, the optimization of ERP systems, management of ERP issues and details of ERP functionality (cf. Schlichter et al., 2010 p. 496). Very few analyzed the failure of ERP implementations and the models how to ensure a successful implementation (cf. Sternard et al., 2011, p. 1513).

Based on relevant literature the author identified the most important critical success factors that are the key driving forces behind successful ERP implementation. Analyzing them individually before each system selection is part of a suggested method driving this research. Given that very specifically for the selection and decision making part of an ERP system there is still very little research work done in this area the dissertation paper focus on it with its main hypothesis.

H0: ***The execution of the decision making process has an impact on the level of satisfaction with an ERP system.***

This means in detail for this research work:

A SME company has a need to implement an ERP system. Whether the selected system is the right one and if it is implemented according to the companies requirements, is founded in the very beginning in the decision making process. Following a very structured high quality decision making process improve the possibility that the right / or one of the best fitting systems will be selected. The satisfaction and the decision making are very strongly related.

The overall research question is defined according to the hypothesis H0:

Is there a relationship between the selection / decision making process of an ERP system and the satisfaction with the system?

Development of a generic process

The research question and hypothesis cover a wider range of the ERP life-cycle process. It connects the beginning with the end of the life–cycle and points out the

interrelations of it. Shaul (cf. Shaul et al., 2012, p362) defined the EPR life-cycle process in four fundamental phases: planning, implementation, stabilization of the ERP system into normal operation, and enhancement. Other cycles described in literature vary very little from this definition mainly in terminology and wording.

This connection of phases is a differentiation factor to all other research studies which usually focus on one phase mainly the implementation phase. Just recently the selection part (acquisition) gets more popular mainly covered by Verville, Palanisamy and Bernadas (cf. Verville et al., 2010, p.36). The selection / acquisition is part of the planning phase. Shaul mentioned as well in a very recent publication that problems occurring with the ERP systems should be based on so called critical success factors and should be traced back to earlier phase requirements and decisions (cf. Shaul et al., 2012, p.371). Markus et al. argued as well that the planning phase is usually underestimated and preventing and resolving future problems start before implementing. He points out that analyzing the planning phase can prevent future failures (cf. Markus et al, 2000, p.255). So, all of the publications support the actuality and relevance of the research question and the model development.

There is additional detail needed to support or falsify the main hypothesis. The main variables are identified according to the following figure (see Figure 1). The independent variables are tight to the selection part of the model. The dependent variables specify the result at the satisfaction part of it.

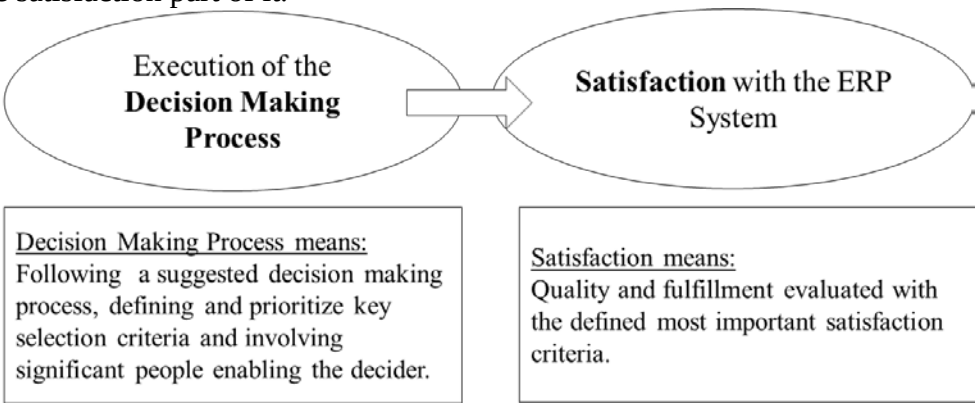

Figure 1: Relation of Variables, created by author 2012

The relation of the variables can be summarized in the following declaration:
"The higher the performance of the execution of the decision making process the higher is the satisfaction with the decision and the more efficient is the ERP system noted."

This statement will be broken down and analysed in more detail in the following paragraph. Meaning the closer the selection is executed according to the developed decision making process the better for the overall efficiency. The dependent part is the challenge how to analyse the efficiency meaning to measure satisfaction in this dependency.

Given it is a mainly unique decision for a company which is not done frequently it is fair to stress that this decision is a purely strategic decision. Strategic decisions of that quality and volume can be categorized as normative decisions where the decision makers mainly should follow a rather rational approach, based on that assumption a model was developed. Considering the theory of decision making and the underlying approach was one input for the development of the process. Rational decisions these days are very often influenced by irrational factors. In this case the process provides the starting point for the selection, it enables the decider to make the first decisions on a pure rational basis and avoid spending a lot of time on gaining this rational experience themselves. In addition for a decision like the ERP selection there are always irrational factors which might have to be considered. The

relation of the pure theoretical approach and the decision itself as a practical result has to be explained in more detail.

As an example a SME company with no experience will select an ERP system. They could start reviewing one ERP software package according to their needs, might add people and requirements to that process over time, review another ERP system add more needs and so on. In this process, they might mix rational and irrational requirements. They end up after an exhausting, lengthy process to decide for an ERP system. The selection itself and possibly the implementation might be a success, but the process executed was very inefficient and the people using the system might be not satisfied. Therefore the company should be enabled at the very beginning to fulfill the main rational criteria and then after a pre-selection add more specific and possibly irrational requirements. A process has been developed considering the various theories and practical experience to ensure this enabling process.

Reviewing the different projections in both theories, the organisational decision making and the ERP life-cycle theory, conclude that most researches are examined about variables but rarely about the nature of the decision itself (cf. Nutt et al., 2010, p. 535ff). Franz and Kramer point out in the article edited by Nutt et al. that a process of decision making should consider the following steps: Decision characteristics and personal & organisational characteristics influence the decision process leading to the decision outcome. They point out that this conceptual process is compatible with the three theoretical orientations: prescriptive, descriptive and naturalistic. Other researchers and theorists add to the decision making approach other orientations like political, organisational and informational (cf. Nutt et al., 2010, p. 525).

Comparing and analysing the different theories of decision making and ERP life-cycle process a decision making process was developed to consider all relevant factors for the efficient selection of an ERP system for SME.

Research Methods

An extensive literature review has been conducted starting from 2009 until 2013. Using the findings of this and the leveraging the experience of other scientists the decision to use and elaborate semi-structured expert interviews has been made. The first literature results have been tested and reflected for the semi-structured interviews. Between autumn 2010 and spring 2012 28 expert interviews have been executed in parallel accordingly. The propositions have been tested in that circle of events. The hypothesis was reviewed from different perspectives.

Semi-Structured Expert Interviews

A questionnaire was developed as a guideline for the expert interviews. The interviews were conducted mainly in person with the expert interviewees. Given the busy schedules of some the interviewees, some interviews were conducted on the telephone but all followed an identical structure. The questionnaire had been submitted in advance of the interviews to allow for preparation by the expert interviewees, when and if time permitted. All answers were discussed fully during the interviews, not just written down on the questionnaire. Some experts sent additional supporting material and brochures after the interview.

The companies in scope are small and medium-sized companies and therefore the relevant experts tended to be the company owners, board members or CEO's or in medium-sized companies the CIO or IT department leads. A total of 41 companies were contacted. Of these, 13 companies decided not to participate for various reasons. The remaining 28 companies with identified interview partners were conducted in 2011 and 2012. In summary, they were all highly knowledgeable and relevant experts.

Results

Satisfaction with the ERP system combines all propositions into a model of dependencies. The level of satisfaction is measured in relation closing the ERP life-cycle combining the beginning, the selection of the EPR system, with the end, the measurement of the satisfaction. Therefore it doesn't result in new propositions it finalise the existing ones with additional information and results in the research questions.

One key critical question after the ERP system implementation is the question, if it is the right system and if the people are satisfied with it in the daily business, then it is evaluated. The related research question has been asked. During the interviews and company studies and the results have been openly discussed as well as at an international conference. One statement came up "There are no criteria defined in the beginning (at selection point in time) and they are not measured after go live for satisfaction". It assumes that success is hardly measured and challenged with the experts. Given the experience with bigger companies it was a high likely hood that success is mainly not measured and defiantly not measured according to predefined criteria. Therefore the question is asked regarding positive and negative feedback. "The satisfaction with the ERP system is mainly gut feel. Only problems, complains and negative impressions are registered. If the ERP system runs successfully it is not captured in numbers."

The questions have been asked as part of the expert interviews. Satisfaction as such had to be rated on a scale from one to ten. One meant the company was not satisfied with the system at all; ten meant they are absolutely happy and satisfied with the ERP system. The next question was much more difficult, the question if they measure the satisfaction or what they relate their result to. One finding was that analysing the satisfaction with the system is hardly based on facts but rather on less negative feedback and feelings. If there are no complains about the system and the issue log is rather low the assumption is the people are satisfied with the system. None of the companies set up a measurement system or structure for evaluation up front. The following graph shows the relationship of the level of satisfaction with the fact how satisfaction is measured. The results from 28 expert interviews are pretty aligned. Most of the companies are satisfied with their solution but none (but one company (24) once) evaluated it. So, it is always gut feel of the senior executives or IT leads. The IT leads stated that they would know if there would be any problems because they would have a lot of negative IT tickets and hotline calls. None of the companies measure the success or satisfaction in any way. So, even another round of interviews wouldn't be more than gut feeling on a different level. Result from all expert interviews regarding it, can be summarized. That they do not measure the satisfaction but even more they do not measure against the original requirements. None of the companies know in detail if the system fulfils the first intentions.

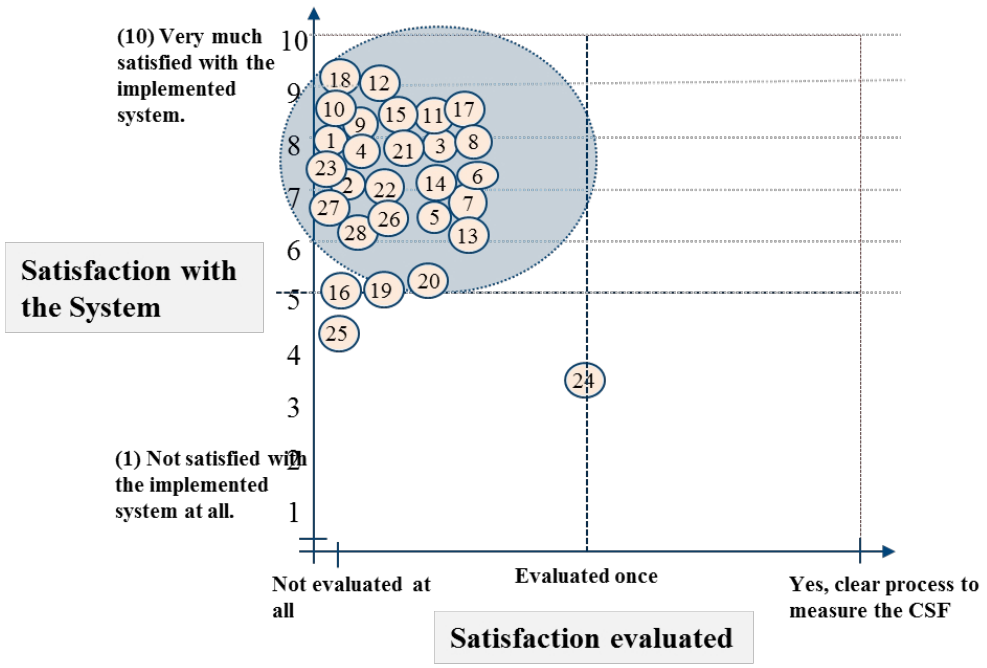

Figure 2: Result Satisfaction evaluated, created by author 2012

In summary; satisfaction has never been evaluated even if most of the people feel satisfied with the system. Satisfaction is based on gut feel and lack of complains. Even the one requirement, is usually not evaluated after go live and beyond. None of the experts did measure success in a structured way and not related to the requirements which triggered the system implementation. Even in the lessons learned of the expert interviews, it was mentioned that criteria should be defined in the beginning and evaluated afterwards for success.

The chosen method of interviewing experts after the ERP system was implemented could not confirm in hard facts that companies are not satisfied with the system. They feel satisfied on basis which is not measurable or supportable in clear hard facts or criteria.

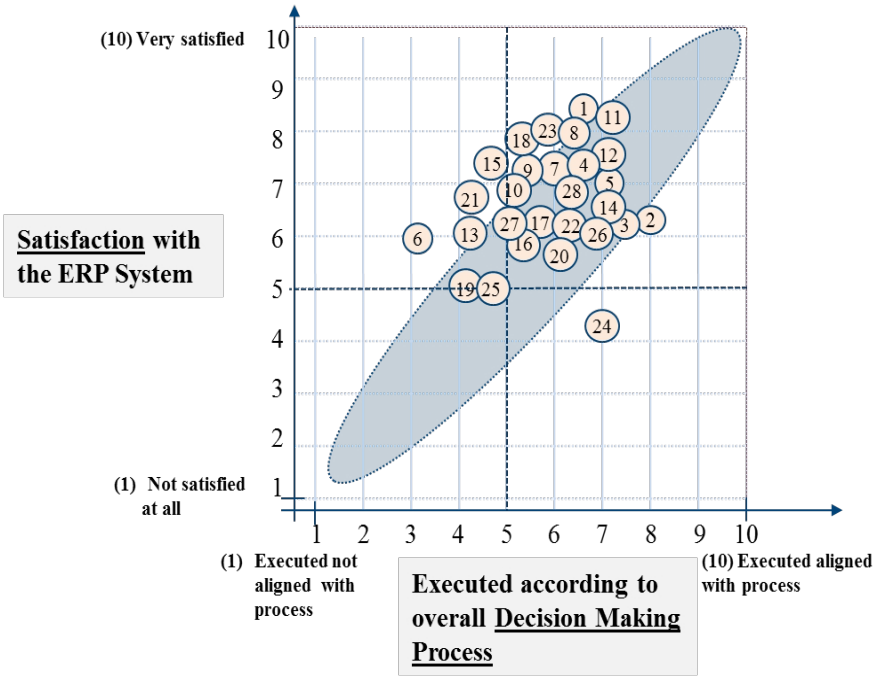

Figure 3: Summarized result of all findings, created by author 2013

In summary, Figure 3 provides an overview operationalized to one factor the execution aligned with the decision making process during selection. As higher the executed efficiency of the selection was, as higher the satisfaction with the ERP system and the overall outcome.

Conclusion

While searching the literature dealing with the criteria for selection as well as ERP selection processes focusing on the selection phase it became clear that these subjects are not complete. This research examined the ERP selection part of the overall ERP life-cycle process with the focus on SME companies. It developed and empirically tested a process relating the selection of an ERP system and the level of satisfaction with the overall ERP life-cycle by defining a set of criteria. The proposed process assumed a high performance approach for execution with the people involved and the criteria defined.

The hypothesis that the execution of the decision making process has an impact on the satisfaction with an ERP system can be confirmed. Even so the underlying research question that there a relationship between the selection of the system at the very beginning of the process with the end the satisfaction with the up and running system.

Although the findings of the current study contribute to a better understanding of the successful selection of an ERP system with long term satisfaction, there are several limitations to this study. The first limitation of the study is its generalizability. The study presents the viewpoints of corporations in the south of Germany in the production industry. It is most probably representative for Western Europe but it is unclear to predict, whether the findings can be generalized for other markets like emerging markets, Asia or the Middle East or even North America where SMEs are in a different position. Furthermore the suggested process should be tested in a greater amount of companies, followed by expert interviews out of these companies. It should be considered that project or company cases usually take over one year until the result can be analyzed and the satisfaction measured according to up front defined criteria. Additional companies could be tested in an early stage or it could be investigated in a comparable industry or product.

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