Risk Management in ERP Project in the Context of SMEs

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Abstract—**This paper contributes to the discussion on Enterprise Resource Planning (ERP) implementations in the context of small and medium size enterprises (SMEs). Fewer than 30 % of ERP implementations have been successful, meaning the projects were completed on time, within budget, and with all required characteristics. The principal reason for failure has often been associated with the poor management of ERP implementation projects. Several standardised methods and techniques have been developed to help enterprises to better manage their ERP projects. The purpose of this paper is to identify and assess the main risks in the ERP projects through the case study of three manufacturing SMEs. By using company-specific risk analysis method (RAM), the critical risks of the ERP projects have been identified and assessed. Then, by using characteristics analysis method (CAM), the recommendations of how to divide the ERP projects into manageable sub projects have been given.**

Index Terms—**Enterprise resource planning, ERP implementation, small and medium size enterprise, SME, Risk analysis method, Characteristics analysis method.**

I. INTRODUCTION

Enterprise Resource Planning (ERP) systems, when successfully implemented, links all functions of an enterprise including order management, manufacturing, human resources, financial systems, and distribution with external suppliers and customers into a tightly integrated system with shared data and visibility [1]. ERP systems promise seamless integration of information flowing through an organization [2], [3]. They fulfill this promise by integrating information and information-based processes within and across the functional areas in an organization, and further, by enabling the integration of information beyond the organizational boundaries. The effective implementation of such a system can bring about many benefits, beginning with the most general, such as cost reduction, productivity improvement, and quality improvement, but also customer service improvement, better resource management, improved decision-making and planning, and organizational empowerment [2]. Consequently, improvement of economic indicators is achievable, which finally leads to an increase in enterprise profitability [4]. However, the evaluation of the contribution of ERP systems in terms of both value creation and economic returns is a difficult task, because of the extent of the organizational changes to which their implementation

leads [5], as well as difficulties in predicting the return on investment [6].

Most large enterprises worldwide have already adopted an ERP system and smaller enterprises follow their lead [7], [8]. This study is carried out in the context of small and medium-sized enterprises (SMEs). SMEs differ from larger enterprises in important ways affecting their information-seeking practices that impact ERP adoption. These differences include [9]: lack of information systems management, frequent concentration of information-gathering responsibilities into a small number of individuals, lower level of resources available for information-gathering, and quantity and quality of available environmental information. SMEs adopt ERP systems especially because of the following benefits [10]: benefits related to the product/market (improvement of product quality, improvement in product design, financial benefits (cash flow, availability of financing, government programs of financial assistance), managerial and organizational benefits (strategic orientation with regard to technology, exposure of management to technology, relations between management and employees, competence of employees, increase in productivity), and benefits related to the sector of activity (competitiveness in terms of cost, environmental requirements).

Despite the significant benefits of ERP systems, the Statistics show that about 30 % of ERP implementations have been successful [11]. Many ERP implementations are difficult, lengthy and over budget, are abandoned, scaled or modified, achieve only partial implementation, are terminated before completion, or failed to achieve their business objectives even a year after implementation [2], [12]. One explanation for the high failure rate is the poor change management and project management skills [13], [14]. Also, the risks involved the ERP projects are not properly assessed or managed [15], [16].

There is a substantial difference between an ERP project and a simple software project [17], [18]. Most software projects focus on developing a software system. But an ERP project consists of tightly linked interdependencies of software systems, business processes, and process reengineering [16]. ERP project can also be viewed as an organizational change project, due to the large number of changes it brings to an organization [18], [19]. Associated organizational and process re-engineering in ERP projects, the enterprise-wide implications, high resource commitment, high potential business benefits and risks associated with ERP systems make their implementation a much more complex exercise in planning, change management and project management than any other software package or

advance manufacturing technology [20].

Several tools, methods and techniques have been developed to help enterprises to better manage their information technology (IT) projects, though they are often too general for ERP applications ([17]. Also, consulting, project management, change management and risk management methods are normally specified for large enterprises [21]. The needs, operating requirements, logistics fulfillment and financial capabilities of SMEs are vastly different from that of large enterprises. In order to support SMEs in their ERP project, targeted risk management processes are needed in this context.

This paper introduces two risk management tools targeted for SMEs in their ERP adoption process. In this study, the purpose is to identify and assess the main risks in the ERP projects through the case study of three manufacturing SMEs. By using company-specific risk analysis method (RAM), the critical risks of the ERP projects have been identified and assessed. Then, by using characteristics analysis method (CAM), the recommendations of how to divide the ERP projects into manageable sub projects have been given.

II. RISKS IN ERP PROEJCTS

A. Characteristics of ERP projects

ERP systems are complex, and implementing one can be a challenging, time consuming and expensive project for any company [2]. Especially challenging it is for SMEs which have sufficient resources, capabilities and ERP project experience. Even with significant investments in time and resources, there is no guarantee of a successful outcome [22]. Consequently, to achieve the desired benefits, the ERP implementation must be carefully managed and monitored to get the full advantage [18]. A successful ERP project involves managing business process change, selecting an ERP software system and a cooperative supplier, implementing this system, and examining the practicality of the new system [23].

An ERP project should have a clear strategic and operational goal. The key persons in the organization should carefully define why the ERP system is being implemented and what critical business needs the system will address [24] in order to satisfy customers, empower employees, and facilitate suppliers for the next three to five years. However, many companies install their ERP systems without fully understanding the implications for their business or the need for compatibility with overall organizational goals and strategies [23]. The result of this hasty approach is failed projects or weak systems whose logic conflicts with organizational goals. Further, usually enterprises do not realise the full benefits that the ERP system offers because they are not organised in the correct fashion to achieve the benefits. Many companies that attempt to implement ERP system run into difficulty because the organisation is not ready for integration and the various departments within it have their own agendas and objectives that conflict with each other [25].

An ERP project is not a simple IT project [13]. A major difference between ERP projects and traditional IT projects comes from the integrated nature of ERP software applications. The implementation of an ERP software package involves a mix of business process change and software configuration to align the software with the business processes. In that sense, the implementation of an ERP system is radically different from traditional IT systems development. In an ERP implementation, the key focus has shifted from a heavy emphasis on technical analysis and programming towards business process design, business-focused software configuration, and legacy data clean-up [26].

The root of high failure rate of ERP projects is the difference in interests between customer organizations who desired unique business solutions and ERP supplier who prefer a generic solution applicable to a broad market [27]. An ERP system as such seldom totally fits the existing business processes of an enterprise. In order to have efficient business processes with the new ERP system, an enterprise has either to change its business processes to fit the ERP system or modify the ERP system to fit its business processes [9]. For SMEs, a good fit between company business processes and the ERP system functionality is the most important selection criteria [7]. Further, SMEs, with their sufficient resources, have to focus on only the most critical business needs.

An ERP project has a major impact on organization. Thus, change management is essential for preparing an enterprise to the introduction of an ERP system, and its successful implementation. To implement an ERP system successfully, the way organizations do business will need to change and the ways people do their jobs will need to change too [13]. Almost half of ERP projects fail to achieve expected benefits because companies underestimate the efforts involved change management [26]. The resistance of change is one of the main problems faced by most enterprises [28]. To decrease resistance to change, people must be tightly engaged in the change process and helped to see how the change profits them. ERP implementation requires a combination of business, technical, and change management skills. Major problem is that SMEs lack expertise in requirement specification and are thus often at the mercy of the ERP suppliers [29].

B. Risk factors

The enterprise-wide ERP projects raise new questions because they represent a new type of management challenge. The management approaches for these projects may be altogether different from the managerial approaches for traditional IT projects [30]. ERP projects may represent new challenges and present new risk factors that have to be handled differently. Such enterprise-wide projects are also large-scale and commercial with unique challenges. An ERP project is a major and risky exercise for any size of enterprise, however, risks are higher for SMEs as the cost overruns during implementation may put financial strain on the firm and thus substantially impact firm performance [31]. In addition, SMEs have less of a chance of recovering from a failed ERP implementation attempt than large enterprises

[32].

The main reason for any IT project failure is that managers do not properly assess and manage the risks involved their projects [15]. Also, most project managers perceive risk management processes as extra work and expense, thus, risk management processes are often expunged if a project schedule slips [33]. The main risk effects for SMEs are budged exceed, time exceed, project stop, poor business performances, inadequate system reliability and stability, low organisational process fitting, low user friendliness, low degree of integration and flexibility, low strategic goals fitting and bad financial/economic performances [17].

Several research studies have investigated the ERP risks and have attempted to classify them in various ways. Following six risk categories is presented by [30]: organizational fit, i.e. failure to redesign business processes; skill mix, i.e. insufficient training and reskilling; management structure and strategy, i.e. lack of top management support; software systems design, i.e. lack of integration; user involvement and training, i.e. ineffective communication; and technology planning/integration, i.e. inability to avoid technological bottlenecks. Later, [34] developed the risk identification list based on the category of [30]. Six main dimensions of risks in ERP implementation is identified by [35], namely, organisational; business-related; technological; entrepreneurial; contractual; and financial risks. Organisational risk derives from the environment in which the system is adopted. Business-related risk derives from the enterprise's post-implementation models, artefacts, and processes with respect to their internal and external consistency. Technological risk is related to the information processing technologies required to operate the ERP system – for example the operating system, database management system, client/server technology and network. Entrepreneurial or managerial risk is related to the attitude of the owner-manager or management team, while contractual risk derives from relations with partners and financial risk from cash-flow difficulties, resulting in an inability to pay license fees or upgrading costs, for example. [30]

Following eight risk factors is identified by [36]: nonexistent or unwilling users; multiple users or implementers, turnover among all parties, inability to specify purpose or usage, inability to cushion impact on others, loss or lack of support, lack of experience, and technical or cost-effectiveness problems. The prioritized checklist of ten software risk items is proposed by [37]: personnel shortfalls; unrealistic schedules and budgets, developing the wrong software functions, developing the wrong user interface, gold plating, continuing stream of requirement changes, shortfalls in externally furnished components, shortfalls in externally performed tasks, real-time performance shortfalls, and straining computer science capabilities. The factors that influence the outcomes of IT projects is stated by [38]: technological complexity, degree of novelty or structure of the application, technological change, and project size.

Four sources of ERP project uncertainty is identified by [39]: the task to be supported, the application to be developed, the users, and the analysts. Several sources of uncertainty be taken into account in the management of IT projects is suggested by [40]: complexity, lack of structure, instability of

project objectives, newness of the technology, users, IT management, upper management, and project size. Five risk factors is identified by [16]: insufficient training and reskilling, insufficient internal expertise, lack of analysts with the knowledge of business and technology, failure to mix internal and external expertise effectively unable to comply with the standard which ERP software supports, and lack of integration between enterprise-wide systems.

ERP project-specific risks, in contrast to IT project risks are [30]: failure to redesign business projects, failure to follow enterprise-wide design that supports data integration, insufficient training and reskilling, insufficient internal expertise, lack of business analysts with business and technology knowledge, failure to mix internal and external expertise effectively, failure to adhere to standardized specifications which the software supports, lack of integration, and attempting to build bridges to legacy applications. The critical success factors for ERP implementations, in which eight of the top ten are related to human factors, is summarized by [12]: top management support, project team competence, interdepartmental cooperation, clear goals and objectives, project management, interdepartmental communication, management of expectations, and careful system selection. Finally, based on the previous research, ERP risk factors is summarized by [17]: inadequate ERP selection, poor project team skills, low top management involvement, ineffective communication system, low key user involvement, inadequate training and instruction, complex architecture and high numbers of modules, inadequate business processes, bad managerial conduction, ineffective project management techniques, inadequate change management, inadequate legacy system management, ineffective consulting services experiences, poor leadership, inadequate IT system issues, inadequate IT system maintainability, inadequate IT supplier stability and performances, ineffective strategic thinking and planning, and inadequate financial management.

III. RISK MANAGEMENT

To minimize the risk of the ERP project, the application of a risk management plan at different ERP implementation project stages is recommended by [3]; selection, implementation, and usage. A planned and systematically adopted risk management procedure throughout the ERP project reduces the possibility to risks occurring. Consequently, according to [41], major mistakes are made in the early stages of the ERP project, even prior to the implementation process. However, [42] emphasizes the efficiency of risk management when it is introduced at the earliest possible opportunity in the life cycle of the system in question, when planning issues are most important and the criteria for system selection are determined. Instead of using abovementioned ready-made risk lists, a company might consider identifying their own, company-specific ERP implementation risk list. These risks could be complemented by common risk lists, such as [30].

According to [37], the risk assessment process contains risk identification, risk analysis, and risk prioritization. Risk identification produces lists of project-specific risk items that are likely to compromise a project's success. Risk analysis

assesses the loss in probability and magnitude for each identified risk item. Risk prioritization produces a ranked ordering of risk items that are identified and analyzed. To be effective a risk assessment method should consider several potential aspects (technology, market, financial, operational, organizational, and business) and link them to the project life cycle [17].

This paper introduces two risk management tools targeted for SMEs in their ERP adoption process. The purpose is to identify and assess the main risks in the ERP projects through the case study of three manufacturing SMEs by using company-specific risk analysis method (RAM) and characteristics analysis method (CAM). First, the critical risks of the ERP projects have been identified and assessed by RAM, and then, by CAM, the recommendations of how to divide the ERP projects into manageable sub projects have been given.

A. Risk Analysis Method

Risk analysis method (RAM) identifies the most essential risks and their probability in the company context. The risk list for the case study has been formed based on the risk list of [29]. In this study, the risk list is formed out of 63 questions or statements dealing with the ERP selection, implementation, and usage. The basic aim is to identify the ERP risks arising from the company's reality and therefore the employees from various levels of organisation have been interviewed and observed. The company-specific risk list has been filled in close interaction with company personnel. Risk assessment for the risk list is done by evaluating each risk's probability and effect in a scale from one to five. The number one means very small probability and effect, and number five means high probability and catastrophic effect. Then, the risk multiplication as an indicator of risk significance has been used. It is calculated as multiplying the value of the probability by the value of the effect. Range of this value is from one to twenty-one. [29]

B. Characteristics Analysis Method

Characteristics analysis method (CAM) is a tool to ensure that the IT project is manageable and consistent by its different goals content and development approaches. The result of the CAM is a recommendation of how to split the large and complex IT project, such as ERP project, into manageable sub projects. Further, the inputs of the CAM are the project proposition document, the knowledge and experience from prior development projects, and the requirements of the of the project portfolio. [43]

In this paper, the CAM analysis is formed out of 90 questions dealing with the ERP project. The basic aim is to find out the manageable size of the ERP project of the case companies. Also, CAM provides recommendations what management aspects should be put more attention to successfully manage ERP project (management of a project as a whole, management of integration, project scope management, time management, cost management, quality management, human resource management, management of communication, risk management, management of purchase). The questions are either positive or negative statements for which their applicability to the project will be evaluated (0 = fault, not true, 5 = exactly right; N/A = don't know). The tool

has been implemented as an MS Excel worksheet with automatic tabulation based on decision rule sets. The result is can also be illustrated graphically (see Fig, 1 and Fig. 2). [43]

IV. CASE STUDY

This study has been carried out through the case study of three manufacturing SMEs. The case SMEs are in different phases of the ERP project. Company A is still contemplating the ERP implementation, Company B is in the selection phase, and Company C is already in the usage phase. In practice, this study has been carried out during 1.1.–30.12.2008.

A. Company A

Company A develops blast cleaning technology and manufactures automated blast cleaning machines and robots (turnover about 1 2 M€ and number of personnel approximately 20). Company A has not an ERP system, but is contemplating the ERP implementation in near future. The need for the new ERP system has grown internally because of the problems in the current IT system. Today, the company is using an excel-based IT system, which includes e.g. the following ERP functions: customer relationship management (CRM), product data management (PDM), purchase and order management, and product lifespan management. The problem of the current system is how to manage hundreds of different versions and variations of Excel, Word, and AutoCAD documents. Critical problems can be found in the tendering and purchase processes, and in production capacity planning. The purpose of company A is to adopt an ERP system, which helps production capacity planning and control so that the scheduling and resource allocation for different projects can be planned in detail before the project is started. Furthermore, the new system should include warehouse and stock management functions and it have to support purchase process.

The risk list has been filled with the company key persons, and the effects and probability of risks have been assessed. In the *ERP selection phase*, the most critical risks which may be realised in company A are: misunderstanding between a buyer and a customer (12), an ERP system is not flexible enough under processes' exceptional circumstances (12), and special needs of a company are not defined (10). In the *ERP installation phase*, the most critical risks are: a company's project manager is not a full time PM (20), data transfers from old to new system is difficult (16), connecting an ERP system to other IT systems creates problems (16), and ERP supplier is not committed enough to the ERP system implementation (15). In the *ERP usage phase*, the most critical risks are: An ERP system is not felt as helping the business (12) and the system supplier does not develop the system in the future (10). Company A is just contemplating to acquire an ERP system. In the RAM results, in every phase (selection, implementation, usage), the crucial factors are depended on the decision of the ERP system itself and the ERP supplier. The technical and functional factors related to the system itself, and the factors related the system supplier, are considered the most critical. Even a company A has very few employees, under 20, the lack of resource, skills and expertise, and other factors related personnel have - surprisingly – not aroused as potential risks in this analysis.

According to CAM, 'Human resource management (HRM)' is the management/leadership field that clearly exceeds the critical level. Company A should direct special attention to this factor in ERP project management. In addition, several other management/leadership fields, such as 'Communications management', 'Purchase management', 'The project as a whole', 'Integration management', 'Project scope management' and 'Quality management' are right at the critical level. Only 'Cost management' and 'Time management' and 'Risk management' are clearly under critical level. According to CAM, factors connected with personnel training and increasing personnel skills and knowledge require more from managing the ERP project, although they are not considered to be amongst the most potential risk factors according to RAM. On the basis of the CAM, it can be deduct that Company A has a clear view of the costs caused by the ERP project, the time spent for it, as well as the technical and operational risks involved. The results analysed by CAM is presented in Fig. 1.
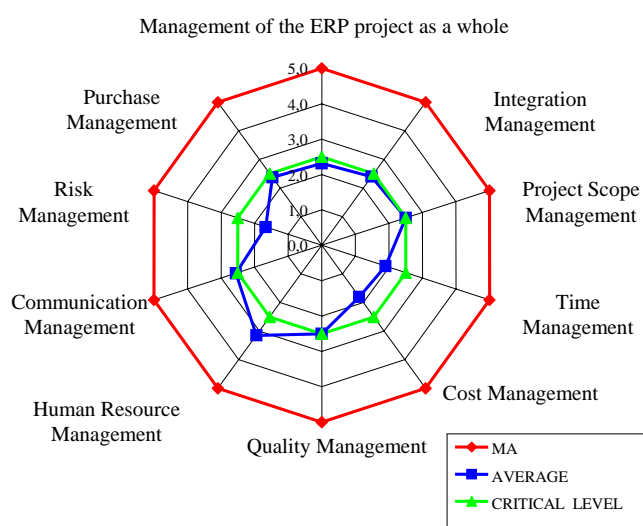

Figure 1. CAM diagram of the company A

B. Company B

Company B provides demanding sheet metal work, welding, and heavy metal works, specialising in steel, paper, chemistry, and ship manufacturing related machinery and equipment. In addition, the company manufactures offshore equipment and ship propellers. The company B employs ca. 150 people. Company B is in the selection phase of ERP project. The company has interviewed several ERP suppliers and has already gone through more detailed discussions with two potential suppliers. The company B has made a preliminary requirement specification, a type of demand list, through which they are able to limit their ERP suppliers to two options. Also, some IT consultants have worked for the company. Company B is very aware that their existing IT systems are already in the end of their life cycle, and they had to invest in a new ERP system.

The risk list has been filled with company key persons, and the effects and probability of risks have been assessed. In the *ERP selection phase*, the most critical risks which may be realised in company B are: An ERP system is poor

compromise for all stakeholders (12), selecting improper project manager or project team, and misunderstandings between a buyer and a customer (10), selecting an improper ERP system (10). In the *ERP installation phase*, the most critical risks are: normal business disturbs ERP project activities (20), ERP project disturbs normal business (16), timetable falls behind schedule (16), Software configuration and testing don't function swiftly (16), disciplined use of the ERP system (data entry is not achieved) (16). In the *ERP usage phase*, the most critical risks are: An ERP system not used in a disciplined manner (12), and only part of the ERP system is used, and benefits realized (12). In the RAM results, the crucial factors are mostly depended on the personnel (including project manager/team and top management level) behaviour, skills, and experience. Company B is also worried of the changes what the new ERP system will affect to the company's normal business, and in opposite, how the normal business hinders the ERP project progress.

According to CAM, 'Communications management' is the management/leadership field that clearly exceeds the critical level. Company B should direct special attention to the factor considered people skills, knowledge and expertise. In addition, 'Human resource management' and 'Quality management' are right at the critical level. To manage ERP project successfully, the company should pay attention to these three management/leadership factors. The results analysed by CAM; is presented in the Fig. 2.
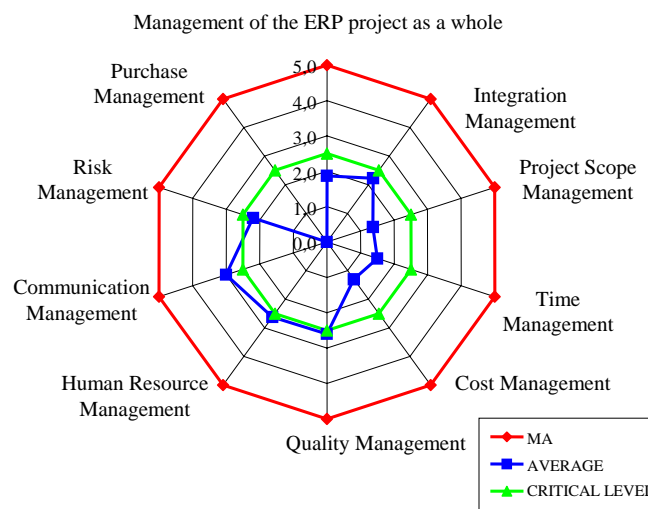

Figure 2. CAM diagram of the company B

C. Company C

Company C has implemented an ERP system a few years ago but only part of the system was functioned complete. Company C is going to continue its ERP project and adopt several new functions of the ERP system in use. The risk list has been filled with company key persons, and the effects and probability of risks have been assessed. The risk analysis has been done focusing on the main risks considered the new modules adoption. Also, because the company C already has the ERP system in use, the selection phase was skipped.

In the *ERP installation phase*, the most critical risks which may be realised in company C are: normal business disturbs ERP project activities (25), cost rise compared to initial

estimations (25), a supplier is not committed enough to system implementation (25), software configuration and testing don't function swiftly (25), company is not important customer for supplier and don't get the best effort (25), and a supplier don't understood the customer needs (25). In the *ERP usage phase*, the most critical risks are: all needed information is not entered into the system (15); only part of the ERP system is used, and benefits realized (12), and the ERP system not felt as helping the business (12). Company B estimates several risks and their probability with maximum rates. This estimate is possibly coloured by the partial failure of their old ERP project, and the communication difficulties they experienced with their ERP supplier. Company B also has few employees (under 20), and when the contact person of the system supplier disappeared in the middle of the project, the risks came true.

The CAM was not carried out in the company C, since they were already at the usage phase of their ERP project. Main usage phase problems occur because of the poor requirements specification phase, and lack of documentations in the implementation phase related to configuration and parameterisation. Also, the key person of the ERP supplier shifted to another company middle of the project.

V. DISCUSSION

The nature of IT project is determined by the risk factors [44]. The ERP project should not be viewed merely as a project of acquiring and implementing a new software system but as a framework project for the company's all business processes. Twofold approaches should be taken for ERP projects [45]: 1) Change the business processes to fit the software with minimal customisation. On one hand, fewer modifications to the software application should reduce errors and help to take advantage of newer versions and releases On the other hand, this choice could mean changes in long-established ways of doing business (that often provide competitive advantage), and could shake up important people roles and responsibilities; and 2) modify the software to fit the processes. This choice would slow down the project, could affect the stability and correctness of the software application and could increase the difficulty of managing future releases, because the customizations could need to be torn apart and rewritten to work with the newer version. Conversely, it implies less organizational changes, because it does not require dramatically changing the company best practices, and therefore the way people work. [45]

SMEs usually have great difficulties in their ERP projects. The most common risk that may entail project failure is the ubiquitous lack of resources and IT skills of the company personnel [31]. ERP systems are typically designed for large companies, and the ERP suppliers do not necessarily understand the special characteristics and operational processes of small companies [41]. The success of an ERP project also largely depends on how well SMEs can manage changes in their business and how well personnel can adopt new way of operations. This change process is best to start already in the early phase of the ERP project, because many risks can be eliminated before the ERP project system starts. The SMEs can e.g. hire temporary staff to perform the routine operations so the key persons get more time to concentrate on the ERP system characteristics and new work practices.

The most potential risks can be divided in the following categories: 1) ERP supplier, 2) ERP system, and 3) a customer company. The most potential risk related to the ERP supplier, is simple to choose the wrong supplier, which doesn't understand the company's special wants and needs, or are not interested enough to committed to the ERP project of small customers. Also, the high potential risk is that the ERP supplier ends the development and/or the support of the ERP system. Most potential risks related to the ERP system are depended on its technical and functional performance and features; how well the system can be implemented, configured, parameterised, and integrated. Most potential risks related to the company itself are connected with the factors of company personnel and company top management; their skills, knowledge, and experience. Also, resistance to change is a typical potential risk factor. Personnel may not see the benefits of the system in their own work and, thus, are not committed to the new business model, and don't use the system in a disciplined manner. Normal business also disturbs the ERP implementation, and personnel may be unwilling to put time or effort to the development work. Top management support to the project is the most important success factor for the ERP project, and the second success factor is the proper, full-time project manager. Similar results can be also found in the literature, e.g. [9], [17].

According to the CAM, the biggest investments in terms of bringing the ERP project to the finish line should be directed at 'Human resource management' and 'Communications management'. In such a large-scale change project ERP project is, the challenge is to make the employees stand behind the change. The ERP project changes the company modes of operation and working processes. For this reason the commitment of staff should be strong, so that new operational models are taken into use and the system can therefore be exploited to its full potential.

The risk of sticking to old ways of doing things after ERP implementation is often high. People are experts at finding reasons why there is no need to change things or why it is better to stick to the old way of doing things, when they do not fully understand the purpose for the change. The change process is as a ground rule condemned to failure if people do not understand the need for change. For this reason it is important to create a clear vision of the desired change and to communicate this really actively to the people involved in the change.

In a long ERP project it is also important to obtain short-term successes so that people do not lose interest in the change process and the final aims are reached. Hence, it is good to divide the project into smaller sub projects. It is typical for change processes that a process is declared a success too soon, at a stage when the first goals of the process are reached. For example, in the case of ERP projects, it is erroneous to proclaim the project a success at the stage when the ERP system they have has managed to run the system successfully and they have just started using it. Only when the system can be fully exploited and the original goals have been achieved can you consider the project to have succeeded.

It is possible to enhance staff commitment to the change process and the new operational model by communicating the change and by training staff. It is very typical that the

need for communication and training is underestimated. The importance of communication can also be seen in the fact that communications enhance the commitment of the management level in the process. It also pays off to communicate issues during the project that are not being done. In this way you can diminish the potential of misunderstandings and to be in control of expectations. At the beginning of the ERP project it is recommended that a communications plan be drawn up, in which target groups, means and timing are outlined. In the case that everything possible in the project is outsourced the company staff will not consider the operational model to be their own.

VI. CONCLUSIONS

This study presents experiences that are obtained in case studies in which three SME companies were drawn an ERP project risk analysis method and characteristics analysis method. The case companies considered both of the methods as good tools for risk management; they forced the company to think of potential risks that might go off at the different stages of the ERP project, whether these risks had to do with the technical and functional characteristics of the system itself, or with the expertise and commitment of the staff, top management or ERP supplier. The CAM helped the case companies in dividing their ERP project into manageable entities and provided them with recommendations on what leadership or management aspects they should devote special attention to. The CAM also showed inadequacies in the fields of management and leadership that the implementation of ERP system causes in companies.

This study has been done in deep cooperation with researchers and company staff. Cooperation with the research group provided companies new skills and support to continue their own ERP project. Company A will take the next step in their ERP project and is faced with an extensive requirement specification process with the objective of mapping out the suitable ERP solutions for the company and to choose their ERP in 2010. Company B made their decision on which ERP system they will choose at the end stage of this study in 2008. Implementation will commence in 2009. Company C aims at enhancing the ERP system they already have in use and to adopt new modules in 2009. Company B has initiated new contacts with their system supplier and commenced the change requirement specification phase of adjusting their current system.

The RAM presents crucial risks in a form and language that is understandable, because the analysis have been done in the company context. As negative aspect of RAM is that it requires a significant amount of work, and also support from external experts. As a conclusion, company-specific risk analysis is recommended, especially for SMEs with low IT skills and scarce resources.

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