

Cross-organizational ERP Management: How to Create a Successful Business Case?

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ABSTRACT

This paper deals with the development and use of business cases in support of cross-organizational enterprise resource planning (ERP)-enabled e-business integration initiatives. In order to ensure that such a project starts successfully, we will focus on pre-implementation activities. We propose a set of business case guidelines that emphasize the importance of benefits management during ERP implementations.

Categories and Subject Descriptors

H.4.2 [Information Systems Applications]: Types of Systems – Decision support D.2.9 [Software Engineering]: Management – cost estimation, time estimation

General Terms

Management, Measurement, Human Factors, Standardization.

Keywords

Business Case, ERP, Cross-organizational, E-Business, Benefits.

1. INTRODUCTION

Developing business cases (BC) prior to approving IT projects is a commonplace practice in today's business. Yet, research indicates that many companies (65% of a studied sample) are not satisfied with their business cases [34] for IT investments. A key point of criticism raised by these companies is that BCs do not actually help them to identify and manage benefits during the implementation process. This finding converges with ERP studies reporting that more than 70% of ERP implementations fail to achieve their estimated benefits [1, 31]. Reasons for this high failure rate are problems with business strategies, project delays, cost overruns and underestimation of the effort required for successful change management [31]. Next to this, IT implementations, and specifically ERP implementations, are reported to be of increasing complexity as businesses cooperate

with other businesses and their supporting systems cross organizational borders [8]. This, in turn, increases the need for a well-managed integration both among different systems and among the cooperating businesses [23]. Moreover, business and system integration based on ERP goes hand in hand with business change, which in turn raises the importance of careful business change planning and management. Consequently, current BC approaches need to be revised and/or extended so that they adequately support BC analysts in cross-organizational ERP and e-business integration contexts.

In this paper, we refer to BCs as structured proposals for business change that are justified in terms of costs and benefits. A BC is a useful tool to support the ERP-enabled business change planning and implementation process. The focus of this paper is on the definition of a structured approach to benefits management as a critical pre-implementation activity in cross-organizational ERP and e-business integration projects. Based on an extensive literature review and expert interviews, we first identified the main causes for unsatisfactory BCs and the issues related to them. We, then, attempted to define solutions to these issues, which we integrate in our BC guidelines. The structure of our paper is as follows. Section 2 provides a brief literature review on business cases and cross-organizational ERP implementations. Section 3 describes our research methodology, which brought us to propose a set of BC guidelines. Section 4 reports on first insights from our survey with consultants and section 5 concludes the paper.

2. BACKGROUND AND RELATED WORK

2.1 Business Cases

A BC exists to ensure that, whenever resources are consumed, this supports one or more business objectives. This implies that a BC should be reviewed at the various stages during the IT lifecycle. Literature indicates that for most IT implementations, BCs are developed [34], but are solely used to obtain funding approval for the huge up-front financial investment and not to actively manage the project [25, 29]. Furthermore, traditional BCs are often only based on financial benefits and costs, and thus, ignore non-financial benefits. Research by Ward et al [34] found that many organizations do not demand precise justification of their investments and, thus, leave benefits imprecisely formulated and overstated. As a result, many companies consider the support BCs bring during ERP implementations insufficient. In this paper, we argue that specifying benefits and related agreements (e.g. ownership) and actions (e.g. organizational change) in the BC is

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important for the success of every IS implementation. Clearly, more often than not, the costs, associated with organizational and business change, are less predictable and therefore either underestimated or not at all included in a BC. We attempt to remedy this situation by proposing a more comprehensive BC concept, one which (i) takes those costs into account, (ii) is updated throughout the ERP life cycle and (iii) provides IT managers with robust guidelines. Because it is important for companies to be able to decide at each stage of the implementation whether or not to proceed with the ERP solution, we will design our BC guidelines in a way that will allow companies to account for the costs of realizing benefits. The purpose of our guidelines is to help (i) accurately determine the financial value of an ERP implementation in terms of costs and benefits, and (ii) actually achieve the desired benefits within time and budget.

2.2 ERP for Networked Businesses

ERP systems are packaged software applications that support most of a company's information needs within and across functional areas in an organization [8]. Originating from back-office transaction processing systems, modern ERP systems serve as the foundation for a wide range of e-business models within one company as well as throughout the value chain [9]. Such cross-organizational ERP implementations enable coordination and collaboration among multiple companies in a value network by automating process work flows and data control flows shared by the partnering businesses. In this paper, we call 'a network business' a network of profit-and-loss-responsible business units, or of independent companies, who cooperate to achieve common business objectives. In the IS literature, the cross-organizational ERP systems deployed by these businesses are also referred to as ERP II [4]. This term was coined by Gartner to denote that whereas traditional systems (termed 'ERP I') focus on the integration of back-office information systems, ERP II focuses on linking the company to their customers (front-end), e.g. customer relationship management (CRM) and vendors, e.g. supply chain management (SCM) [4, 35]. The differences between ERP I and II have been analyzed and assessed by IS researchers [3, 4, 27, 35] in terms of the application domain and the architecture of the system. Whereas ERP I systems are typically found in the manufacturing and distribution domain and have a web-aware but relatively closed architecture, ERP II solutions serve all sectors and rest on a web-based open architecture. The above differences are important when it comes to defining the project and system success, and in turn, when conceptualizing cost and benefits in the BC. For example, research by Gable et al. [14] showed that existing models of IS success, which are geared towards ERP I, may not be entirely appropriate measuring ERP II success, as the systems are more complex. After having compared ERP I, II, and custom ISs with each other, based on published studies [3, 4, 6, 10, 27, 35], we distilled some issues and challenges which are particular to ERP, as opposed to other IS implementations. Therefore, they merit special attention in the BC:

- ERP II projects are often dominated by conflicting priorities and interests of the stakeholders in the partner companies, which makes coordination a challenge [7].
- The implementation of an ERP I as well as an ERP II system comes usually along with the need for business process as well as people change [8].

- Long benefit payback periods make the management and assessment of the ERP system very challenging [15].
- ERP systems are more complex than ISs, and therefore ERP implementations are also more complex than IS implementations and hence more likely to fail [12].
- Taking all of this into account, ERP implementations can offer more benefits as well as more costs [8].

A complete BC needs to address these issues and be able to reflect the complex nature of ERP system implementations [28]. In our paper, we will adopt and adapt some IS success models [18, 33] to an ERP setting. Furthermore, we will provide a first set of steps and guidelines for successfully implementing ERP II systems.

3. RESEARCH METHODOLOGY

Our paper is set out to answer the following research question: *What should be included in a business case so that it takes benefits management into account and helps to successfully implement ERP systems in cross-organizational settings?* In order to answer this question, qualitative as well as quantitative research is needed. This is reflected in the research methodology which we followed in this study. It is shown in Figure 1. It includes eight steps and rests on guidelines developed by several researchers [21, 36, 37]. Each step is labeled with a number and referred to in the text.

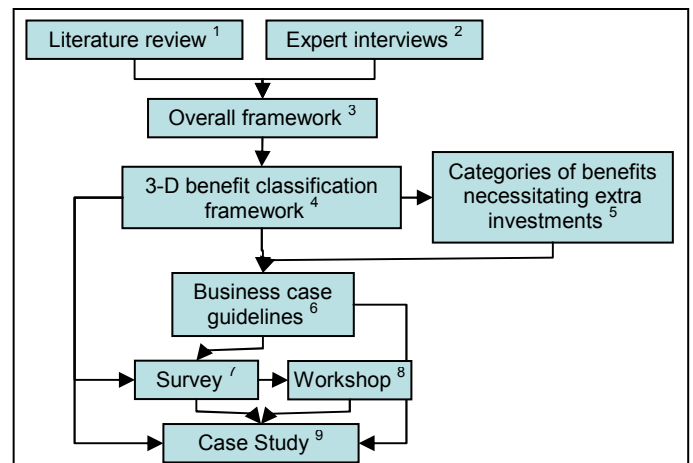


Figure 1: Research Methodology

The research process uses two exploratory steps (1+2) aimed at formulating an overall framework (3) for cost as well as benefit estimation during ERP implementation. The insights on benefits are used for the following two steps where we develop a benefit framework (4) which we use to identify special categories of benefits (5). Combining the frameworks (3+4) with information collected during the literature study (1) brings us to our first set of business case guidelines (6) which we validate during a survey (7) and validate using a workshop (7) and case studies (8).

More in detail, each step in Figure 1 was carried out as follows: Our extensive literature review (1) covered the topics of cross-organizational ERP, ERP cost and ERP. The overall framework (3) was developed based on the cost and benefit literature. However, this paper focuses solely on the benefits side of cross-organizational ERP projects. In order to develop a benefit framework (4), we added the following areas to the ones already

included in our literature review: (i) valuation of IT investments, and (ii) the balanced scorecard (BSC) approach in IS. Our extensive review included several bibliographic databases (ACM Digital Library, Compendex, IEEE Xplore, ISI Web of Science, Science direct (including Elsevier), SpringerLink, Wiley Inter Science and EBSCO Business Source Elite) where search queries covering the topics described were used to obtain a set of articles. Besides the systematic analysis of these sources, we extended our review with new relevant articles and original sources which we found in the reference lists of our reviewed articles.

Next, our preliminary data collection consisted of four semi-structured interviews with experts (2) from consulting companies ranked in the top ten in the Netherlands. All interviewees were asked the same questions interrogating three aspects: how their organization currently estimates and manages (i) ERP costs/efforts; (ii) benefits; and (iii) the relationship of the two. Furthermore, they were asked about their experiences with ERP BCs and about the conditions under which BCs were found helpful. The results of these interviews were used for both the overall as well as the benefit classification framework development (3+4). The benefit classification framework will be described more in detail in the later part of this paper. Further, it will be used as one important element in our BC guidelines (6) which help to plan and manage the BC used during the ERP implementation. In order to test whether our benefit framework and BC guidelines can actually be used in practice we are currently conducting a survey (7) amongst consultants from independent consulting companies as well as internal consultants from ERP adopting companies in the Netherlands and Germany. Based on our data and the results of the discussion we will adopt our benefit framework and BC guidelines (these feedback loops, taking place after each step, are not shown in Figure 1 to ensure readability). As a last step we will validate our results with a case study of a company that uses our guidelines during an ERP implementation (9).

4. THE BUSINESS CASE GUIDELINES

Clearly, defining guidelines for a complete BC is a very complex and time consuming task. Therefore, in this paper we narrow down the discussion to those guidelines that refer solely to benefits management, as this is the part of the BC which is not much researched yet. Based on the work by Ward et al. [33] on benefits management for general IT investments, we developed a benefit dependency network specific for cross-organizational ERP implementations, shown in Figure 2. Unlike the framework proposed in [33], our benefit dependency network shows a direct link to the costs, associated with the benefits. Further, it shows a clear structure, which is important in complex situations such as cross-organizational ERP implementations.

Our BC guidelines follow the structure shown in Figure 2. Therein, we mirror the iterative process of ERP implementations in our BC, by allowing for changes in the guidelines at each stage of the ERP life cycle [8].

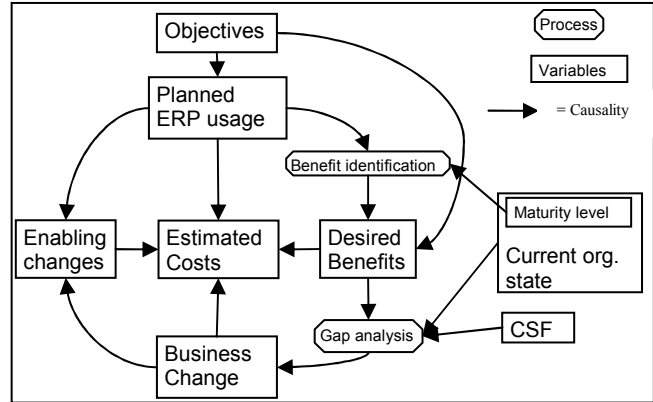


Figure 2: Benefit dependency network

Step 1: The BC starts with the assessment of the current business situation, resulting in an overview of internal and external issues that need to be dealt with in the ERP project and BC, i.e. the drivers of the project. By addressing these business drivers, clear objectives/ goals, which have a desired value, are formulated for the BC. These objectives are the start point of building up our benefit dependency network.

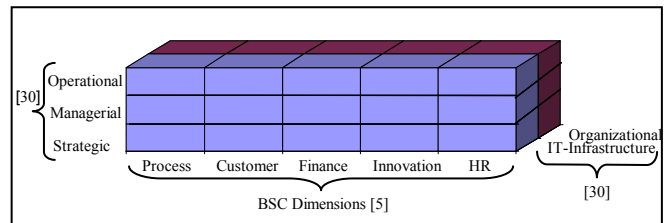


Figure 3: Basic three-dimensional ERP benefit framework

Step 2: As shown in Figure 2, the objectives predefine the (planned) ERP usage, i.e. our IT enabler in the case of ERP projects. This is the IS required to support the project, as it allows the benefits to be realized and provides the basis for change to be undertaken. Therefore, it is logical that the ERP usage will have impacts on enabling changes and the benefits. Depending on the required ERP system characteristic (functionality, performance, scalability), the costs of the whole program will change as well.

Step 3: Assuming a relation between ERP usage and desired benefits, one should be able to connect them in a coherent process that optimizes both. The benefit identification process, which is based on our benefit framework shown in Figure 3, is our original contribution to providing a clear structure on how desired benefits can be identified [6]. (The framework rests on earlier work by the authors. For more information see [11].) We make the note that so far, previous research [33] did not provide such guidelines and linked the benefits directly to the objectives. By using the table shown in Figure 3, stakeholders are asked to sort the goals, identified in step 1, according to their nature, which can be operational, managerial or strategic [2]. Given the goals, management can now identify the benefits that are expected to arise when the goals are achieved. One can identify those benefits within each category by means of the BSC dimensions [18], that are linked to processes, customers, finance, innovation and HR, respectively. We think that the use of common BSC guidelines [19] will help to successfully perform this step. Within each of the so far identified benefit cells in Figure 3, one can make a

distinction between those benefits that are related to the IT-Infrastructure and those that are related to the organizational situation [30]. This last part of the framework is still a work-in-progress and our future research will focus on providing clear guidelines for this division. We, however, think that structuring the benefits around a framework is very useful, as it allows for comparisons among projects. Moreover, we hope it can stimulate, at pre-implementation time, detailed discussions among stakeholders about the expected benefits [34]. In our view, this structured benefit identification approach might be especially valuable for companies with low maturity level with respect to ERP implementations [16]. However, further research needs to be done to assess this relation in more detail and to determine the value that companies at different maturity levels can get from our benefit framework.

Step 4: Once the desired benefits are identified, several attributes related to the benefits need to be identified as well: these are owners, measurements and quantifications. For each benefit, an owner needs to be identified who will gain from the successful ERP project and therefore will take responsibility for those changes that might be needed during the ERP implementation. The owner should work together with the project team throughout the implementation stages [26]. However, when evaluating the benefits achieved, it is important to note, that not all benefits are of value to all stakeholders. Next, it is vital at this stage to determine how the benefit will be measured and quantified. This might be a difficult task for some benefits, primarily for those which are intangible; however, it is necessary to ensure that all achieved benefits are also recognized when the project is over. It is also essential at this point to investigate the interdependencies between the benefits which might reinforce each other, as shown in Figure 4. Therein, a circle refers to a benefit category and a pointed arc shows the interdependencies between benefit categories. The labels in each circle refer to the specific kind of benefit that the circle represents. For example, “OP” refers to operational benefits which are related to processes. Thus, one can see that e.g. benefits in OP are expected to influence operational benefits related to finance (OF). The interdependencies shown in Figure 4 are just arbitrary examples, so one can argue for all kinds of different combinations. Further research is necessary to investigate the exact relations between the benefit categories.

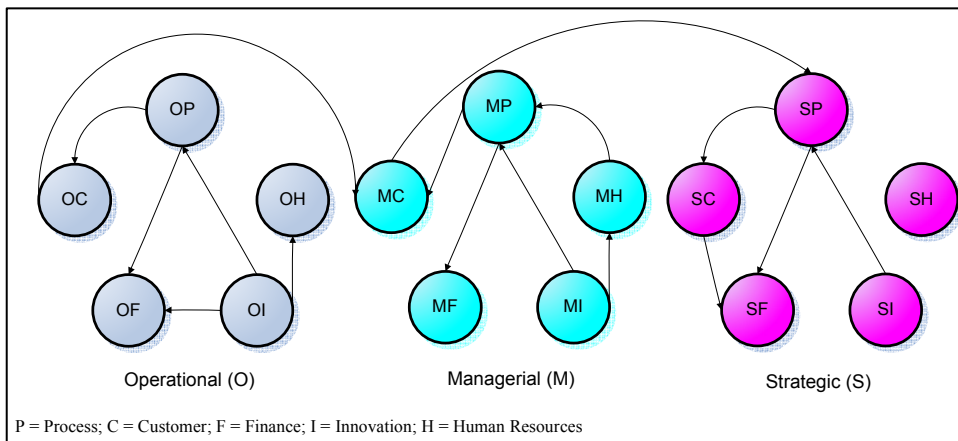


Figure 4: Examples of interdependencies between benefits

Step 5: Because business change is unavoidable when major IT systems are implemented [33], the next step is to take the need for

change management into account. Business change can be defined as various new ways of working. A typical approach being used to determine the business change needed is gap analysis; that is to compare the current organizational state with the desired state. A number of gap analysis techniques have been described in the ERP literature. For example, by Kerimoğlu et al. [20] who show how organizations can reach an optimal point where gaps between technology, organizational processes and humans (culture) are minimized and ERP utilization is maximized. This can be achieved with the help of carefully managed business process reengineering (BPR), change management and customization. Ferrario et al. [12] provide another model to assess gaps in the following seven dimensions: information, technology, business processes, organizational culture, adjustment to the ERP, employees’ skills and work with methodologies. Both tools can be used in the future to assess gaps between the current and the desired organizational state. Thus, one could adopt these models to our benefit dimensions and use them during the gap analysis shown in Figure 2. The expected outcome would be a list of required business changes that are needed to achieve the desired benefits and organizational situation. To each business change from this list a value or size/effort indicator could be assigned, so that business change is measurable. Besides the current and desired situation, critical success factors are expected to influence the gap analysis, as they will indicate factors that the organization needs to change.

Special attention should be drawn to those benefits which are only realized when additional investments, such as change and knowledge management are made [13, 17]. These are most often intangible or subjective benefits (e.g. associated with innovation, learning, improved co-ordination). While their realization is often overlooked, they are critical for an organization’s successful ERP system implementation [22, 24]. The achievement of these benefits increases the commitment by many stakeholders, such as customers and staff members, as they are interested in the realization of these benefits. Financial benefits on the other hand, mainly serve the interest of senior managers and shareholders and are therefore not as crucial for stakeholder commitments as intangible benefits are. We further expect these intangible benefits to provide a vital basis for a successful integration between the system and the e-business. Therefore, we argue that activities to realize the benefits associated with the innovation/HR and IT-infrastructure/ organizational columns of our benefit framework are crucial for the success of an ERP implementation. Concluding, one can say that these benefits need special planning and attention during the business change planning process, as we assume a relationship exists between the amount of business change and the estimated ERP cost.

Step 6: The last step of our guidelines is to identify the enabling changes needed for the achievement

of all business changes indicated in Step 5. Examples of enabling changes are training and education in e.g. how to use the new system or how to deal with business changes. Such change-

enabling activities are further dependent on the ERP usage, as e.g. the type of the system implemented will influence the decision on which training is needed. As already identified for most other steps, the activities performed in Step 6, related to enabling changes, are expected to influence the overall estimated cost.

Step 7: For a BC to be complete, costs and risks associated with the ERP project should also be assessed. Many factors influence the cost assessment [32]; however a discussion on ERP cost is outside the scope of this paper. Nevertheless, it is important to keep in mind that besides the costs directly linked to the ERP system (e.g. license and maintenance costs), the costs identified above during benefit management also need to be considered.

5. PRACTICAL INSIGHTS

In order to see if our basic benefit framework and our proposed BC guidelines converge with what consultants see in their practice, we carried out interviews with four consultants from the top ten Consulting Companies in the Netherlands. Among the interviewed experts, there seems to be a consensus on that the estimation of benefits seems to be difficult (even more difficult than cost estimation), as the benefit estimation problem itself is only partially understood. Consultants seem to agree with our theoretical research findings that especially the measurement of intangible and soft benefits is an important but challenging task. An illustrative example given to us in an interview refers to benefits achieved through training of employees as part of change management activities. The first belief is that training of this nature will result in a certain benefit for the company, as the employee will be suited better for his/her job. However, training of employees also involves the risk that an employee will leave the company after being trained, as he/she has now a better market value and might earn more at a different company. Thus, in order to keep the employee, customized incentives need to be arranged. This example clearly shows how the realization of benefits results in additional costs, and further illustrates that the measurement of benefits is a difficult task.

6. CONCLUSION

Implementing an ERP system in a cross-organizational setting is a challenging task. Proper guidelines are needed that successfully guide managers through the implementation process. A business case can be of use during this process. We developed BC guidelines that are able to handle various issues that come along with an ERP implementation in a cross-organizational environment. The key part of our BC guidelines is benefits management, a topic often ignored in BC literature. Because the problem of understanding and assessing the benefits of cross-organizational ERP systems is under-researched and few benefit measurement tools have so far been proposed, guidelines bridge an existing knowledge gap and, thus, make important contribution to the ERP BC practice. Our study builds on a multidimensional framework which we developed earlier. We further show that the realization of some benefits, which are e.g. intangible, is dependent on business and enabling changes. In order to analyze the extent to which our framework and guidelines are in line with the experience of ERP consultants we are currently conducting an online survey in which we collect data on how consultants are using BCs during ERP implementations. Besides information about the timing, goals and actors involved in the BC, we collect data about which parts are included in practical BCs and how

consultants currently identify, describe, quantify and measure financial as well as non-financial benefits. We expect first result of this study during this fall. In order to ensure that all answers are interpreted correctly and thus ensuring validity we will invite the survey participants to a workshop where we will discuss the results with them. Our expected outcome of this process is a set of refined BC guidelines which help consultants and client companies to successfully implement and integrate ERP systems also in complex e-business settings, such as cross-organizational implementations.

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