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Creating Business Value from Cloud-based ERP Systems in Small and Medium-Sized Enterprises

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Abstract. This qualitative study focuses on how small- and medium-sized enterprises (SMEs) can realize benefits and create information technology (IT) value by investing in cloud enterprise resource planning (ERP) systems. We interviewed 19 respondents from cloud providers and cloud clients and found that their SMEs experienced both benefits and challenges when implementing cloud ERP systems. The digital value was obtained through work process automatization, fast updates of system functionalities, enhanced security of data storage, and increased access to critical business data from multiple digital units. Challenges in realizing these benefits related to organizational compliance with standard solutions and the need for organizational changes for employees to optimize system usage. The SMEs preferred an informal process for realizing benefits and creating digital value from the system. In contrast, the providers wanted to integrate benefits realization as part of their formal implementation methodology. Based on frameworks identified in the literature, we integrate a benefits realization model with an information systems value model to understand how SMEs realize benefits and create business value from cloud ERP systems. We contribute to the SME literature and explain the value creation process for SMEs implementing cloud ERP systems.

Keywords: Cloud-based ERP system, SaaS, benefits realization, IS business value

1 Introduction

Enterprises face an increasingly turbulent and competitive business environment, and advanced information systems (IS) functionality is essential to stay competitive and profitable. Obtaining and maintaining state-of-the-art IS functionality is challenging for any company, but it is particularly challenging for small- and medium-sized enterprises (SMEs) because of their limited human and financial resources [1, 2].

SMEs make up more than 99% of the enterprises in market economies, provide more than 50% of the employment in industrialized countries and contribute significantly to economic development [3]. Thus, the survival and growth of SMEs are crucial to the income and welfare of citizens—in any industrialized country. It is, therefore, important for SMEs to utilize new technology innovatively and realize its potential benefits [1].

Cloud computing is a promising way to effectively provide advanced IS functionality to SMEs [4]. The *software-as-a-service* model offers SMEs advanced enterprise system functionality as a subscription service over the Internet [5]. Customers can utilize state-of-the-art enterprise resource planning (ERP) systems without investing in servers or human IT capabilities, making such systems feasible even for small companies [6, 7]. However, there is still a lack of knowledge about how SMEs realize value from such technology [8]. We have, therefore, explored how cloud-based ERPs are implemented in SMEs. To guide our investigation, we have addressed the benefits and challenges of cloud-based ERPs and explored how SMEs realize the benefits of this technology. We conducted a qualitative study comprising interviews with both providers of cloud-based ERP systems and SMEs using cloud-based ERP systems. The study was guided by the following research question: How do SMEs generate benefits and create business value from cloud ERP systems? The paper is organized as follows: The next sections present related work on cloud computing and benefits realization. Then, we present the research method, followed by the results, a discussion, and implications. Finally, we offer concluding remarks.

2 Background

Cloud services have recently gained popularity among enterprises. Such services vary from small applications to large business-critical systems, platforms, and infrastructure. Cloud providers give customers access to a wide variety of IT services over the Internet, freeing them from the restrictions of locally installed software and local infrastructure or traditional application service providers (ASPs) [9]. They also make it feasible for small companies to implement advanced IT functionality that they could not acquire otherwise due to limited resources and a lack of IT capability [10].

Cloud services are the modern operating model for ERP systems. Cloud-based ERP systems can be defined as ERP software distributed over the internet, and such systems are usually accessed via a browser. Cloud-based solutions allow customers to acquire an ERP system without having to manage hardware, software, or updates, while also reducing upfront system costs. Cloud-based ERP solutions offer functionality similar to that of terrestrial systems; however, their infrastructure (software, hardware, etc.) is delivered and managed by the suppliers [11].

The literature has identified several benefits related to cloud ERP systems, such as time savings, reduced costs, scalability, updates, and easy access [4, 12, 13]. Some scholars have posited that many of these benefits materialize by themselves when a company implements an ERP in the cloud [14], while others maintain that many important benefits do not materialize without deliberate benefits management processes [15, 16]. It is, therefore, important to understand how the benefits from SaaS ERP can

be fostered. Further, evidence suggests that many IT projects fail to realize their planned benefits and that success depends on certain inhibitors and facilitators [17]. The term *benefits management* can be defined as "the process of organizing and managing such that the potential benefits arising from the use of IT / IS are actually realized" [18, p. 36]. The approach emphasizes that benefits only appear through changes made by individuals or groups of users and that these changes must be identified and managed to succeed. Benefits management and change management are, therefore, closely related [19]. Realizing the maximum value of IT investments depends particularly on three competencies: benefits planning, change management, and benefits realization. This last competency requires companies to conduct organizational changes, especially when implementing such extensive systems as ERPs.

In this paper, we have utilized Ward and Daniel's [18] benefits management model to understand why and how potential benefits are realized [18]. The model consists of five steps in an iterative process: (1) identifying and structuring benefits, (2) planning benefits realization, (3) executing benefits realization, (4) evaluation and reviewing results, and (5) potential for further benefits. The stages in the benefits realization model are necessary to better achieve the potential benefits of the IT investment. They relate to the organization's ability to achieve value from the IT investment. In addition, we wanted to combine the benefits realization model with an IS business value model; it is important to understand how businesses create value from their IT investments by embedding benefits management into the IS value creation process.

There are a number of IS business value models, such as Schryen's IS business value model [20], Soh and Markus' IT business value process model [21], and Melville at al.'s IT business value model [22]. Since Ward and Daniels' benefits management model is a process model, and our findings are consistent with this perspective, we argue that a process model will best capture how benefits realization contributes to IS value creation. We have, therefore, integrated the benefits management model stages into Soh and Markus' (1995) value creation process model [21] to get a better understanding of our findings (see figure 1).

3 Research Approach

We conducted an inductive qualitative study in Norway comprising semi-structured interviews as the primary empirical data source. In total, 19 interviews were carried out. The informants were drawn from two different providers offering cloud-based ERP systems (8 informants) and nine SMEs that use these solutions (11 informants). The companies involved operate in different business domains, including logistics, travel industry, health care, manpower and recruiting services, IT business, and voluntary organizations. The informants from the providers were working as senior consultants, while the informants participating from the SMEs had company roles such as CIO, project manager, financial director, administrative leader or accounting controller. The interviews were mostly conducted face-to-face at the companies' sites. A few interviews were conducted through Skype. The interviews lasted approximately 1 hour and

were taped and fully transcribed. The interviews were largely dialogue-based [23] (the interview guide is presented in the Appendix). Secondary data sources included internal project documents.

The empirical material was systematized and reduced [24]. Then, long statements were condensed to shorter quotes to filtrate the essence of the text, and sequences in the text were interpreted to generate themes [25]. We combined previous research studies documented in the literature (e.g., studies focusing on cloud ERP implementation, IT value models, and concepts from benefits realization models) with our empirical findings to gain a broader understanding of how SMEs can generate digital value by implementing cloud-based ERP systems. The insight from the two provider organizations and some of their SME customers allowed the generation of thick descriptions and rich insight into the implementation of cloud-based ERP systems and perceptions of IT value creation. The content of the interviews had a retrospective character, and the findings represent stories and events from both ongoing and completed cloud ERP projects in which the informants are or were involved.

4 Results

The interviews focused on the benefits of cloud ERP systems and how SMEs can realize these benefits and create value from these investments.

All respondents emphasized that cloud-based ERPs simplify and automate several work processes and manual tasks through standardization and making employees work more intelligently. Several SME informants also noted that the ERP system was easy and intuitive to use, and that user support was easily available due to a large number of users. One of the provider informants explained that cloud-based ERP systems are better than on-premise systems regarding automatization: “cloud-based systems are easier to keep updated with new functionality, and thus it is possible to achieve more automation.”

We also found a difference in the degree of automation the system supported and that the SMEs had different expectations regarding enhancing and creating new processes. Some of the SMEs sought to automate a number of manual processes, while others sought to automate as many processes as possible and integrate the ERP system with other systems to ensure inter-system communication. These SMEs had higher expectations of the system and a better understanding of how the system could be exploited. In addition, they expected more from the providers regarding process awareness and support to realize maximum automation and optimization of work processes. The main benefits identified from the study are summarized in table 1.

None of the SMEs stated that they performed planned benefits realization processes. Nevertheless, several *informal* benefits realization steps were activated. These steps were not standardized as a part of the implementation methodologies applied by the vendors. Table 2 briefly summarizes the benefits realization steps the SMEs performed. The steps are based on Ward and Daniel’s (2006) benefits realization model, which identifies which activities are performed in each step.

Table 1. Benefits of cloud-based ERP systems in SMEs.

Themes of benefits identified	Explanations
Simplifying and automatizing work processes	Work processes are standardized, automated, and simplified based on "best practice"
Future-oriented technology	The system develops over time through new solutions, technology, and modern digital designs
Security	ERP systems are offered by professional providers that take security seriously
Cost reduction	The system reduces customers' costs, releases resources, shifts responsibility for the IT infrastructure to the provider, and reduces the need for internal IT competencies
Continuous updating	System updates happen automatically for all users
Saving time	The system supports fast implementation, automatized processes, and diversity of units (e.g., mobile units)
Availability	The system is available through a web browser and several mobile units

Most of the SMEs explained their needs and expectations to their provider, who provided feedback on how the system would support these requirements. In some cases, the provider explained this during the sales meeting, and the SMEs got a sense of the benefits they could achieve by adopting the system. However, most of the SMEs had not documented their expectations and had no appointed person responsible for following up on these benefits. One of the two providers was interested in implementing benefits realization as part of its future methodology and suggested that the SMEs chart their expected benefits. The other provider had developed a value proposal to present to the customer. This value proposal was a summary of the benefits customers could achieve based on information provided during the sales process. Since none of the SMEs had a prepared plan for realizing benefits, it became difficult to explain how the realization of benefits was performed.

The most challenging issue in the benefits management process was activating organizational change. Though cloud ERP systems are easy to implement, employees still need to change their routines and work processes to optimize the system. One consultant highlighted this: "The most challenging thing is the people working in the company. No doubt about that. The employees are worried about doing something wrong in the system before they get to know it properly. That is easy to overcome. But there are people that do not want to change. There is a quite big group that has this personality." SMEs might choose to implement a cloud ERP system because of its ease of implementation; however, to realize the benefits, various change activities may be necessary. As one informant shared: "With regard to the amount of time spent in the implementation, we see that we are well below compared to traditional systems. But that does not mean that customers are able to learn the system faster. You need to focus on this after the implementation." Furthermore, several consultants pointed out the difficulty of changing a business' mindset when shifting from an on-premise system to a cloud-based system: "When establishing a cloud-based system, then we need to inform

employees that we are using a cloud-based system. So, the biggest challenge is to get the employees to realize the benefit." This explains the importance of informing the entire business about the benefits of the system and the process to understand the value of the change. The findings indicated that some SMEs felt they lost control of their own systems when they moved to a cloud solution and became part of a larger cloud ERP user community. A consultant from one of the providers believed that this challenge is especially true for businesses with strong IT departments, as members of IT departments may express strong resistance if they feel that they are losing control and power. Moreover, customers may feel that they lose control when processes become automated, as they cannot access each of the steps. One of the consultants pointed out that this is a common challenge for accountants who have worked in their own way for a long time. A willingness to change and the ease of implementation were perceived as benefiting by the implementing company, indicating the degree of maturity: "If you succeed or not, depends very much on the maturity of the company." However, this problem was considered to be larger in a cloud-based environment than in an on-premise ERP environment.

Some of the SMEs emphasized that the implementation methodology was not entirely appropriate for their business. They thought the methodology was very good for implementing the system itself but felt that it did not support or suggest any process or benefit improvements. As a result, they did not change their processes as they originally wanted.

However, the enterprises had to adapt to the system to get the most out of it. The SMEs had different approaches to managing the organizational changes to achieve maximum system benefits, but there were some similarities. Specifically, all SMEs performed employee training. Some did this together with the provider, while others performed training internally.

One of the consultants from the provider side pointed out that it is difficult to give concrete figures on the benefits of cloud ERP systems as the quantification of concrete benefits depends on several prerequisites. The consultant noted that such quantification is not impossible; however, it requires industry knowledge and an understanding of how the customer's company works. Some of the consultants pointed out that evaluating benefits was a natural task at the end of the project when they discussed with the customers how the implementation had turned out. Based on these conversations, the consultants would write a "lessons learned" report to support future improvement.

One of the partners of the providers worked to make benefits realization an integral part of the process, such that they followed up with customers following implementation. The providers pointed out that the many benefits of a cloud-based ERP system are easy to evaluate informally following an implementation. These benefits include, among other things, increased work process efficiency, the lack of need for an IT infrastructure, and the release of resources. One of the SME informants emphasized how they obtained efficiency gains: "[Efficiency] was easy to observe. With the new system, it is easy to handle a bulk of [transactions] at the same time. So, instead of spending one minute per customer, then we use five minutes for 100 customers." Some informants also mentioned that they had meetings with the provider both along with the way and after the implementation when a review of whether the goals were reached or not

was conducted. Some informants mentioned that, even though they did not formulate a benefits realization plan, they had clear goals for what they wanted to get out of the implementation. These goals were discussed after the implementation. In general, few evaluation activities were carried out, but various goals were evaluated informally in project status meetings. Though the effects were not measured, several of the SMEs informally noted the benefits of the implementation.

The SMEs under study were satisfied with the implementation of the systems and regarded them as successful. Moreover, they noted that several of the benefits of a cloud-based ERP system manifested after extended use. These benefits were often associated with streamlining and automating processes, improving utilization of the system, and developing skills through learning by doing. It took time to explore all the system's functions; therefore, it was easier for users to identify new benefits and potential benefits when they had more experience. Both of the providers experienced that their customers achieved more benefits when using the system on a continuous basis: "Some of the values are already realized after three to four months in the project. While other values take more time to realize [because of higher task complexity]."

None of the SMEs formally identified potential extended benefits. Some noted that they were constantly working to optimize and become more effective, but that these efforts were not necessarily in the context of the cloud-based ERP system. In some cases, employees offered requests for improvements, but this was not a pre-planned event.

The providers and the SMEs had different perspectives on benefits realization. The following quote from an SME illustrates this: "We are not the kind of organization that develops measurable benefits before we conduct a project. We have some hypotheses and some resolute goals we want to achieve and follow up. But we do not have a systematically structured plan. We are not so fond of the benefits realization concept at all, especially if we need to pay for it." Moreover, the SMEs thought that the benefits of the system were clear and that there was no need for a formal realization approach: "The benefits were very clear when we implemented a new cloud-based ERP system, even if they were not documented and measured." In addition, the SMEs were not familiar with the concept of benefits realization: "I think there are many terms for this, but people do not always use the same term. We are always operating to make everyday life better, but we may not call it benefits realization. We aim to change the system to get something better, nothing worse." The providers had a somewhat different opinion on this, arguing that it was important to be aware of benefits realization approaches to obtain better value from the system, as illustrated in the following quotes: "I think customers could have used the system better by being more aware of benefits realization." Furthermore: "You could certainly get paid for having a benefits realization plan for projects. It should be a responsibility both with us and the customer, where we are responsible for initiating and telling the customer that it could be a good idea."

Table 2. Benefit realization plans and actions for cloud-based ERP systems in SMEs.

Benefits realization	Explanations
Identification and focus on benefits	Several of the SMEs identified benefits through dialogues with the provider, sometimes developing a value proposal
Planning of benefits realization	None of the SMEs had developed a formal benefit realization plan
Executing the benefits realization plan	None of the SMEs had a formal benefit realization plan to execute; however, some practiced change management
Evaluation of benefits	Informal evaluation through dialogues with the provider and observation of use
Potential for extended benefits	None of the SMEs formally identified potential for extended benefits; however, some were working on optimizing and increasing the effectiveness
Perspective on benefit realization	The SMEs did not see the need for a formal benefit realization focus, while the providers were more receptive towards this idea

5 Discussion and Implications

We have explored how SMEs aim to generate benefits and create value from their cloud ERP systems. In addition, we have identified challenges in obtaining benefits and creating value.

Previous literature has identified organizational change as a key challenge. When an organization adopts a cloud-based ERP system, it leads to a number of business process changes [26]. Organizational change is crucial for realizing benefits and is an important part of the benefits management process. Companies must learn to handle processes and data differently. The literature describes that the challenges for organizational change are greater among larger businesses than among SMEs, as fewer SME employees facilitate personal follow-ups [27]. This can explain why few of the SMEs experienced an organizational change to be a challenge.

The results of this study are partly consistent with previous literature. Both the literature and the results revealed by the providers identified organizational change as a central challenge, as companies must change their thinking and their processes from previous systems. We found that the companies underestimated change management in the benefits and value creation process when implementing a cloud-based ERP system. As a sales tactic, consultants often argue that implementation is fast. This may cause customers to believe that changes will be rapid and require little effort.

The SMEs under study did not follow a *formalized* benefits realization approach; thus, no benefits realization approach was institutionalized as a formal and standardized process in their organization. There were several reasons for this. Some thought it was more expensive than necessary, while others believed that the benefits of a cloud-based ERP system were so clear that there was no need for a formal benefits realization approach. If an IT project goes according to plan, it may achieve the desired benefits.

However, if companies focus only on tangible benefits, they may miss other important benefits [18, 28].

The ERP literature points out that benefits realization has always had a low priority among SMEs [29, 30]. There may be several reasons for this. For example, evaluating IT investments and benefits realization may be seen as too extensive and complex and not worth implementing [28, 31]. Furthermore, the benefits realization effort is perceived to be too expensive [28]. Finally, SMEs feel that they have too little time to implement procedures and that the extent of the implementation is too small to justify the benefits realization measures [31].

On the other hand, the benefits realization literature suggests that the value gained from benefits realization is greater than the cost of implementing the measures [18]. One of the basic assumptions in the literature on information systems is that IT has no inherent value [19]. To realize and sustain benefits, any potential benefits must first be identified together with the necessary organizational changes. Ownership and responsibility for the realization of each benefit must be established, and the ways in which the benefits are to be realized must be planned in detail. Introducing benefits management significantly increases the likelihood of achieving a full range of benefits. Benefits management also supports a clear understanding of how an organization's personnel should work together to achieve the desired benefits [19]. We found that the informants believed that benefits realization was better suited for larger businesses than for SMEs. However, Peppard et al. (2007) demonstrated that small businesses also benefit greatly from a focus on benefits realization [19].

Several of the studied SMEs identified potential benefits with the help of the suppliers. One of the providers developed a value proposition that specified potential benefits, and this value proposition was reviewed at the end of the project to evaluate whether the project had been successful. Apart from this, however, none of the SMEs developed any plans for how to realize benefits. Without such plans, it is hard to see how companies can realize the benefits effectively. Some researchers have asserted that, if SMEs choose the right system, they can realize some benefits without further benefits realization planning [29]. However, other researchers have posited that the benefits do not come automatically and that they need to be managed actively [19].

Our findings indicate that some of the potential benefits of a cloud-based ERP investment in SMEs are considered too obvious to necessitate a benefits realization plan. Nevertheless, we believe that SMEs can better achieve the potential benefits of the system by implementing such an approach and that a benefits realization plan can help them realize all benefits more effectively. If an enterprise saves time and resources without a clear plan for how to exploit these savings, it will not achieve any business value [19].

As mentioned in the background section, we wanted to utilize the IS value model developed by Soh and Markus [21]. This model depicts the link between IT investments and organizational performance. This can be perceived as a chain of necessary conditions, such that enhancing organizational performance requires IT impacts, which, in turn, require IT assets and IT investments. In this context, IT investments mean investments into the cloud ERP system, any required new infrastructure, human resources, and management capabilities [20]. IS assets consist of IT, human resources, and, in our

context, the cloud ERP system. IS impacts refer to one or more of the following benefits: improved operational efficiency of processes, new/improved products or services, and strengthened organizational intelligence and dynamic organizational structure [21, 22].

Benefits management will help develop and explicate the potential benefits of an ERP system and clarify how to manage the process of achieving this value. The benefits management process is an important means to contribute to the IT conversion process, the IT use process, and the competitive process geared toward realizing the full range of potential value. We conceptualize how benefits management can be integrated into the IS value model in figure 1 and illustrate its contribution to IS value creation in the discussion below.

We argue that the lack of benefits management is a serious limitation when SMEs adopt cloud-based ERPs. SMEs do not realize the full range of benefits and, therefore, miss a substantial portion of the potential value. The first benefits management stage, *Identifying and structuring benefits*, builds the rationale for adopting cloud-based ERPs and, therefore, improves the likelihood of securing appropriate financial and human resources for the implementation process. The second stage, *Planning benefits realization*, prepares the organization for performing the required organizational changes. The third stage, *Executing the benefits realization plan*, involves implementing the plan in practice. We, therefore, suggest that the first three stages of Ward and Daniel's (2006) framework support the IT conversion and the IT use processes and help the organization achieve appropriate IT assets and impacts. Figure 1 combines the IS value model and benefits management into a framework to illustrate how SMEs create value from their IT investments by integrating benefits management into the value creation process.

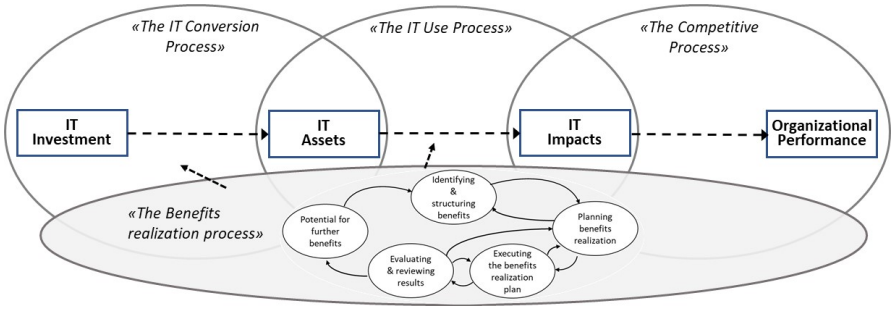


Fig. 1. Framework for understanding how SMEs realize benefits and create value from IT investments (e.g., ERP cloud systems; adapted from Ward and Daniel and Soh and Markus [18, 21]).

6 Conclusion

We have explored how cloud-based ERPs create digital value in SMEs. SMEs experience several benefits and challenges related to cloud-based ERP systems and a lack of benefits management. The digital value was achieved through the automatization of work processes, fast system updates, enhanced security of data storage, and increased availability of business-critical data. Organizational change was difficult to implement

and was the most important challenge in the benefits management process. We found that the SMEs had no formal benefits management processes and that they preferred an informal process for creating digital value from the cloud ERP system. In contrast, the providers wanted to integrate benefits realization as part of their formal implementation methodology. Without such plans, it is hard to see how companies can realize benefits effectively. The main contribution is a conceptualization of how benefits management can be integrated into the IS value model. We thus propose that the benefits management process would be a valuable addition to Soh and Markus' (1995) IT value creation model.

This research has several limitations. It was performed in one country with a small number of informants and, therefore, has limited generalizability. Further research should explore this pertinent issue in other contexts, using the present research as a basis for subsequent quantitative studies to provide generalizable results.

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Appendix – interview guide

1. What do you think are the most significant benefits when implementing a cloud-based ERP system?
2. What do you think are most challenging when implementing a cloud-based ERP system?
3. Did you experience any challenges in the implementation process and how did you handle the challenges?
4. Did your organization carry out any activities to prepare the employees? (training, competence building, etc.)
5. Did you have a meeting with the supplier where you discussed what benefits you could possible achieve from the system?
6. Did you create a plan or strategy to achieve expected benefits?
   - If no: why not?
   - If yes: Can you elaborate on the plan and strategy in the organization?
7. Did you evaluate the achievement of the benefits during the implementation process?
8. Do you know if the various benefits were measured quantitatively during or after the implementation?
9. Did a specific employee have the responsibility for making sure that the benefits were realized?
10. Did you have a follow-up plan after the implementation regarding achieving the expected benefits?
11. Did you achieve specific benefits after the system went live? Would you say that you achieved more benefits than previously assumed?
12. Have you made new goals after the system went live – regarding how you can better utilize the system? Ex. become more effective?
13. Were there any gains you did not realize?
14. Did you have to change processes to adapt to the system?
15. What were typical changes you had to make?
16. Did someone have responsibility to take care of executing the changes?
17. How did you experience the willingness to change among employees?
18. Did you assess whether the implementation was successful / unsuccessful?
19. How was success considered?