MANAGING CHANGE IN ERP IMPLEMENTATION: LESSONS LEARNED FROM AN SME CONTEXT

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Abstract

Organizations implementing enterprise resource planning (ERP) systems experience the need for extensive changes in structure, core processes, and roles - making change management crucial. Prior research on change management in ERP implementations focuses mostly on large enterprises and lacks empirical insight into why change management is challenging. We conducted a case study in a Norwegian Small and Medium-sized Enterprise (SME) working in mechanical manufacturing. Interviews, observations, and documents were analyzed. This study contributes to the literature focusing on change management in ERP implementations and provides rich insight into how and why change management is challenging in an SME context by detailing eight key reasons behind 33 challenges. Lessons learned from this study may have transferable value to other SMEs implementing ERP. The study highlights the importance of considering culture, overall organizational workload, and ensuring deep engagement during an ERP project. Several of the challenges were interconnected. Customizing organizational processes was challenging because it opposed the established culture within the company, risk management was underestimated, and culture was more of an impediment than a facilitator for change management. Finally, the management style, lack of holistic project view, and lack of competence in computer usage were also identified as challenges impeding an efficient implementation.

Keywords: ERP implementation, SME, critical success factor, change management, culture

1   Introduction

An enterprise resource planning (ERP) system compromises software modules which allow organizations to integrate business function processes in real-time (Davenport 1998). An ERP system builds on best practices and usually the adoption of such a system cause changing the roles and core processes of a company. To manage such changes, the need for change management arises. Laudon & Laudon (2020) state that a substantial percentage of Information Systems (IS) projects stumble because the process of organizational change is not adequately addressed, and that careful change management is required. Previous research studies confirm change management as one of the most critical success factors (CSFs) in ERP implementations for large enterprises (Kim et al. 2016). However, studies focusing on CSFs related to change management for ERP implementations in small and medium-sized enterprises (SMEs) have got less attention in previous research. SMEs represent most organizations worldwide, and they differ from large enterprises in that they employ fewer people (250 or less) and have lower turnover (European 2020). SMEs are typically distinguished by their informal structures and culture (Iacovou et al. 1995) which contrast with larger enterprises. In SMEs, there are usually resource constraints (Achanga et al. 2006), top management is more involved in day-to-day activities (Cartan-Quinn and Carson 2003), and they, in contrast to large enterprises, face more significant challenges when adopting technology (Shin 2006). For example, SMEs might be at higher risk when implementing ERP because of resource poverty and they might also have less knowledge about the digital transformation that follows from an ERP implementation (Hustad and Olsen 2014).

Introducing an ERP system relates to changing something, often technically and structurally, and is related to processes and people (Volkoff et al. 2007). Such changes often lead to powerful organizational and behavioural impact (Laudon & Laudon, 2020, p. 590). Also, the change from the current state towards the wanted state is a lengthy and complicated process. It involves changes in culture and how people work (Jiwasiddi and Mondong 2018). Thus, the need for change management arises. Some even argue that failure in change management is the main reason for ERP implementation failure (Almajali and Tarhini 2016). Change management is critical for ERP implementations (Lee and Pai 2003; Robey et al. 2002), and for change management to be successful, one must consider several factors such as communication, end-user training, top management support, and more.

There are several calls for future research on change management during ERP implementations in SMEs (Ali and Miller 2017; Ranjan et al. 2016), and more specifically, there are calls for such research to focus on CSFs in specific contexts (Doom et al. 2010; Hasheela-Mufeti and Smolander 2017; Saade and Nijher 2016).

Moreover, previous studies suggest future research to focus on giving deep insight, instead of providing a long list of identified CSFs without providing an understanding of what is behind each factor (Akkermans and Van Helden 2002; Van Hau and Kuzic 2010). Finally, there are calls for future research to focus on the impact of culture during ERP implementations in SMEs through case studies (Doom et al. 2010; Drummond et al. 2017). This study seeks to bridge these gaps.

The following research questions have guided this study: *(1) How do SMEs manage change during ERP implementations? and (2) Why is change management challenging to tackle during ERP implementations in SMEs?*

We conducted an interpretive case study (Walsham 2006) in an SME operating in the mechanical service industry in Norway. The company Mech (pseudonym) was in the process of an ERP implementation. The data collection consisted of interviews, document analysis, and observations. We used the literature of ERP implementation in SMEs as a foundation for our study, and we utilize the CSFs literature and change management literature in ERP studies as a lens guiding our research. The paper is organized as follows. First, we provide an overview of relevant ERP research for this study. Second, we present the research context and method. After that we present our key results followed by discussion, contributions and concluding remarks.

2 Research Background

We utilize the critical success factor (CSF) and literature for enterprise systems to explain our findings in this research (e.g., see seminal work of Somers & Nelson (2004) explaining different factors). Especially we focus on change management which is highlighted as one of the most important CSFs in ERP projects.

ERP systems are complex information systems, and the implementation process may be long and difficult causing drastic changes in business processes and the employees' way of working. Thus, the risk for a misfit between the system and the organization should not be underestimated (Volkoff, Strong, & Elmes, 2007). In addition, it is important to take into account the allocation of resources in the implementation process to avoid user resistance.

In recent years there are an increasing number of companies that have invested in ERP systems, and there are several studies focusing on how to obtain a successful implementation of an ERP system, and numerous CSFs have been identified and categorized in different ways (Akkermans et al. 2003; Al-Mashari et al. 2003; Finney and Corbett 2007; Grabski and Leech 2007; Moon 2007; Somers and Nelson 2004). The main idea is that critical issues experienced from prior implementations may be learned and transferred to other ERP contexts to avoid repeating the same failures (e.g., Moon 2007). In this extensive literature, there have been different approaches for doing studies on CSFs in ERP implementation. Somers and Nelson (2001) proposed the most important CSFs from a broad literature view and conducted a study to identify the utmost CSFs through ranking. Secondly, they performed a fine-tuned analysis to determine how the importance of these CSFs varied across the stages of the ERP life cycle (Somers & Nelson, 2004). They found that *top management support*, *clear goals and objectives*, and *user training* were the most important CSFs in the first three or four stages of the implementation. So are *change management, Business Process Reengineering (BPR), interdepartmental cooperation* and *interdepartmental communication*. *Use of consultants*, and *partnership with vendor* were particularly important in the post-implementation phase. In other studies, CSFs are also classified into generic categories, taxonomy, and unified CSF models (Al-Mashari et al. 2003; Esteves and Pastor 2006; Finney and Corbett 2007). Examples of meta-categories are strategic and tactical CSFs, which can also be classified further into technical and organizational CSFs.

Moreover, a state-of-the-art study focusing on ERP implementation challenges, identified the most predominant failure issues (Momoh et al. 2010). Important reasons for failure were lack of change management, lack of commitment from top management, too much customization leading to internal integration problems, and misalignment with the ERP system and the underlying business model, misalignment of business strategy and the selected ERP solution, lack of appropriate training for both management and employees, poor understanding of the business requirements and the implication of an ERP-system within the organization.

Despite many CSFs and prior experiences that can advise your company through an ERP implementation, there are still projects that fail (Ribbers and Schoo 2002; Soh and Sia 2005; Willis and Willis-Brown 2002). For SMEs with limited ERP experience, CSFs may be difficult to understand and follow without specific guidelines (King and Burgess 2006). By reviewing prior research, we identified 14 CSFs crucial for change management during ERP implementations in SMEs. Table 1 provides an overview of these factors with references. A list of critical factors may have limited value, if we do not have an appropriate understanding of how they influence the implementation project. So far, there are limited studies that focus on the challenges of tackling CSFs and the role of change management in this sense.

Change management (CM) is a critical issue for all organizations implementing ERP projects. Managing change is difficult and several approaches are discussed in previous literature; however, there is a call for more empirical research to better understand its critical factors (Todnem By 2005) and how to implement change management in practice. BPR is an example of a change management approach, and ERP implementation projects that bring along requirements for BPR are referred to as either ERP-driven BPR implementations (Huq et al. 2006) or as a technochange approach (Markus 2004).

CSF
Business process reengineering (Drummond et al. 2017; Hasheela-Mufeti and Smolander 2017; Hidayanto et al. 2013; Snider et al. 2009)
Risk Management (Malhotra and Temponi 2010; Shaul and Tauber 2012)
Top Management Support (Doom et al. 2010; Drummond et al. 2017; Hasheela-Mufeti and Smolander 2017; Hidayanto et al. 2013; Jiwasiddi and Mondong 2018; Snider et al. 2009)
Vision for Change (Doom et al. 2010; Drummond et al. 2017; Hasheela-Mufeti and Smolander 2017; Hidayanto et al. 2013; Jiwasiddi and Mondong 2018; Snider et al. 2009)
Clear and Systematic Planning (Doom et al. 2010; Hasheela-Mufeti and Smolander 2017; Shaul and Tauber 2012)
Communication (Doom et al. 2010; Drummond et al. 2017; Hasheela-Mufeti and Smolander 2017; Hidayanto et al. 2013; Malhotra and Temponi 2010; Shaul and Tauber 2012; Snider et al. 2009)
End User Involvement (Hasheela-Mufeti and Smolander 2017; Jiwasiddi and Mondong 2018)
Project Champion (Hidayanto et al. 2013)
Project Management (Doom et al. 2010; Drummond et al. 2017; Hasheela-Mufeti and Smolander 2017; Shaul and Tauber 2012; Snider et al. 2009)
Project Teams (Doom et al. 2010; Drummond et al. 2017; Hidayanto et al. 2013; Snider et al. 2009)
Commitment to change (Drummond et al. 2017)
Org. Resistance Management (Drummond et al. 2017; Malhotra and Temponi 2010)
Training and Education (Doom et al. 2010; Drummond et al. 2017; Hasheela-Mufeti and Smolander 2017; Shaul and Tauber 2012; Snider et al. 2009)
Management of Expectations (Snider et al. 2009)

Table 1. Change management CSFs crucial for ERP implementation in SMEs

Several CM issues have been identified, such as leadership, barriers to change, inadequate communication, and organizational culture (Huq et al. 2006; Ngai et al. 2008). Dialog-based communication is crucial in tackling resistance to change (Shaheen 2016). To create and communicate a vison for an CM project is acknowledged as one of the most critical elements needed to succeed (Kotter 2007). However, the way a vision is transferred and implemented in an organization is significant (Stapleton and Rezak 2004). This is also supported in a study conducted by Naslund (2004), who highlights several organizational roadblocks as important for change management in ERP projects, such as the lack of shared vison, the lack of top management support, and the lack of commitment to change management. Several practical actions suggested to overcome these roadblocks include team organization, communication and knowledge transfer, training and education, and collaboration with consultants.

CM is needed to cope with user resistance and involves attempts to decrease user resistance by focusing on perceived value (Kim and Kankanhalli 2009) or by determining the sources of user resistance to the ERP system (Aladwani 2001). Several factors that lead to change management problems have been identified, such as failure to anticipate and plan for resistance, difficulty in gaining cross-functional cooperation, and failure to consider politics when implementing a change management approach (Grover et al. 1995). To overcome these issues, previous research recommends communicating the positive outcomes and benefits of ERP implementation by carrying out workshops and establishing locally customized training and education for end-users (Boudreau and Robey 2005; Motwani et al. 2005). In sum, CM is one of the most cited critical success factors for ERP implementation, but there is still uncertainty regarding what change management tactics would work, meaning more in-depth research about this construct is needed (Finney and Corbett 2007). Furthermore, there is a lack of studies focusing on CM in relation to CSFs in ERP implementation projects.

3 Research site and method

The research site is Mech, a mechanical SME service company working in manufacturing in Norway. The reasons for choosing this company were many; it is in the local environment and is quite

representative for the Norwegian SME context with customers belonging to the oil, gas, and subsea segments. In addition, it provided an opportunity to follow this implementation through both observations and interviews. The selection of this company was also related to the history of earlier ERP implementations that had not succeeded, the culture of the company, and in addition it was interesting to reveal how the organization managed the challenges when replacing their old ERP system. Finally, it was an important purpose to get a better understanding about how SMEs tackles complex ERP implementations.

At the time of the study (Autumn 2019 and Spring 2020), Mech had 98 employees working permanently and 20 employees on temporary contracts. To better compete in the market, Mech has made a transition from a project-oriented production with customized products towards a standardized production consisting of mostly standardized products. Historically, Mech has not utilized IT systems to its full potential, and one interviewee stated that they first started to use computers in the early 2000s. Before the implementation of SYS2 (pseudonym, for their new ERP system) they used SYS1 (pseudonym for their old ERP system). SYS1 was manually updated by only a few selected employees, and the system was not adequately implemented, and employees worked around it. Information was dispersed across emails, saved in shared windows folders, on single computers, in personal folders, and non-digital solutions were applied (paper-based). With the project-related production, this worked fine as production was oriented around a particular project, but with the standardized production, the previous ERP solution became unmanageable. With the project-related production, all aspects of the production were managed by a project manager. There were, in addition to departmental silos, also silos between the projects. When changing to standardized production, the company was not able to run and tackle its business with SYS1. This was one of the main reasons for why Mech decided to change their ERP solution with a system supporting their new business model.

Mech knew that their current processes were outdated and that they did not fit with a standardized approach. There were several issues that the implementation of such system would solve. Sales, procurement, production, document management, logistics, quality control, and finance would be coordinated. Such a change would cause a dramatic change to Mech, its processes, structure, and, more generally, its way of doing business. SYS1 did not include this functionality regarding production. As a result, deliveries were often delayed, and it affected Mech's ability to stay competitive. Thus, a need for an ERP system that fits an environment with standardized mechanical manufacturing emerged, and the company decided to select SYS2 as the new ERP solution. SYS2 is a cloud-based Software as a Service (SaaS) ERP system, ran on a multi-tenant solution.

We chose an interpretive case study approach (Walsham 1995) because of the importance of studying ERP implementations and change management in their real-life context (Yin 2003). This approach was particularly important given our emphasis on following the implementation in presence at the location. Furthermore, in case studies a phenomenon is examined in a natural setting, multiple means are used to collect data, and the complexity of the phenomenon is studied intensively. A second reason for choosing a case study approach was that we felt the existing body of literature did not adequately describe the phenomenon under investigation (Eisenhardt 1989). Our primary data sources comprised 14 semi-structured interviews and more than 300 hours of observations were conducted. The secondary data consist of internal ERP project documents, and internal email communication. Our interviewees represented all Mech's core departments of business and administration. Furthermore, the interviewees represented different age, gender, duration of employment, involvement in the ERP implementation, organizational role, knowledge of ERP systems, and level of education. Finally, both the management and operational levels were represented. The interviews were recorded and transcribed verbatim. The transcript data was further compared and integrated with observation data and documents. The coding of the empirical material was supported by the software NVivo following the procedure of first – and second-order coding (Miles et al. 2018). By using the framework of CSFs identified in extant research, the CSFs were created as categories in NVivo prior to starting the process of coding the empirical data. A provisional coding approach was applied to map the data to our predefined CSFs while still being open for new topics to emerge (Kvale and Brinkmann 2009). The outcomes of the first cycle were further analysed inductively

to identify evolving patterns comprising change management challenges and the reasons behind these. Several iterations were done by combining the analysis with new data collection. We then developed a summary of key findings including sample quotes and visual representations.

4   Main results of the study

We will first explain the observation of the organizational culture in Mech, which was an important reason why the ERP implementation became quite a challenge. *The organizational culture* at Mech has not changed much over the years. Also, the typical career ladder allows apprentices to move on to become supervisors, and eventually managers, without having any formal education within the area. One of the interviewees stated that this created a culture of leaders that did not necessarily operate in the best interest of the company.

Thus, it led to much freedom among employees to do what they felt like doing. An example of consequences of this is employees freely going for several smoking-breaks without facing any consequences for working less than others. Also, there is no culture for following processes and routines. Instead, there has been much room for making shortcuts and quick fixes, which may have benefitted them in the short term, but not in the long term. One of the interviewees put forward that the new ERP system, in terms of routines, they needed to start entirely from scratch.

As a result, changes became difficult because of established mindsets, which one interviewee describes, *"For some, it is a big, big change to start eating lunch at twelve instead of eleven thirty, it just cannot work."* One interviewee put forward, *"Some people here are ready for change as long as they do not have to change themselve*s." Mech's culture and history with significant changes was also highlighted by an employee working there for more than 30 years, *"Now we have done it, we are doing something new. That is a revolution here at the company."* The culture is described as the biggest challenge for the ERP implementation to succeed, *"Yes, without a doubt. There is a lot of bad culture in the company. And it has grown over time, especially the last years when they got new owners."*

As a result of the culture, the willingness of employees to take part in a change initiative was very low. It has become particularly challenging to convince the employees to be a part of the change. Thus, efforts were needed to change the culture. Mech has focused on hiring new employees that are more used to change, and they have carried out conversations with employees who resist change. For instance, one of the interviewees stated, "*[...] such things are done here now, and with new work clothes, it builds culture. Before everyone went in a rag as they could, a torn t-shirt, no one cared [...] But now we get the feeling of being a team because everyone is dressed the same way, and that is good.*"

The culture has also resulted in an increased need for focusing on communication, training and education, and end-user involvement.

Another cultural aspect at Mech was the fear of doing something wrong, described by one of the interviewees, *"[...] if you did something wrong, you would have been hanged for it, rather than getting praised for trying."* However, although this fear has seen a decline in recent years, it caused employees to avoid initiating changes. It became easier not to take responsibility for issues rather than dealing with them. This fear made it difficult for the employees since, in the new ERP system, everything should be registered, including who made the changes. Also, implementing the new ERP system highlighted Mech's change towards a streamlined and standardized production company, which the culture was not prepared for.

Table 2 provides an overview of the key finding from this study – and shows how the organizational culture in Mech is causing many of the challenges during the ERP implementation, which also made change management difficult to perform.

CSF	Challenge	Reason(s) for challenge
BPR	Adapting to new processes	**Cultural inheritance of not accepting change**
Commitment to change	Discover resistance	Employees may not be explicit about resistance
	Ensure continual commitment	Requires continual efforts
Communication	Creating commitment	**Lack of resources, cultural distance between operational and management**
	Informing all employees	Shift schedule, culture, lack of access to e-mail, lack of attendance
	Providing sufficient information	Meet individual information needs, lack of insight into employees' prior knowledge, hard to identify the need for information, late involvement of employees
Company support	Get employees to understand the need for an ERP system	Operational employees did not use computers, lack of knowledge about ERP systems and the organizational processes
	Ensure continual support	**Lack of end-user involvement, history of failed implementations, emerging issues**
End-user involvement	Involving all end-users	**Schedules, lack of attendance, lack of end-user engagement**
	Getting feedback and input	Lack of early involvement
Management of expectations	Hard to convince employees that this implementation will be successful	Bad implementation of prior ERP system
	Realistic expectations of system usage	Many employees did not use any systems, thus hard to know what to expect of the new ERP system
	Fulfill given expectations	**Changes in the plan due to the ad-hoc approach**
	Employees expectations to the system	Rumors and resistance
	Management's expectations to the employees	Rumors and resistance
Organizational resistance management	Detecting resistance	**Culture of employees not communicating their problems**
	Fighting resistance	Misconceptions due to lack of involvement

CSF	Challenge	Reason(s) for challenge
Planning	Sticking to the original plan	**Ad-hoc approach, all-time high**
	Planning resources	All-time high, emerging problems
Project management	Prioritizing resources	Unclear boundaries between project and operations, all-time high, emerging problems
	Addressing problems	**Ad-hoc approach cause Mech to be reactive instead of proactive**
	Keeping a holistic view upon the implementation	Project managers additional responsibilities, all-time high
Project team	Project members ability to handle project and line related tasks	Project team got drowned in tasks
	Worn-out employees	Project-related task came in addition to their line related tasks, excessive use of overtime
Risk management	Mitigate and avoid risks	**Ad-hoc approach, lack of ability to identify risks, all-time high, loss of holistic view**
	Utilize the risk matrix	Lack of familiarization of the risk matrix among the project team, ad-hoc prioritization of risks
	Identify risks	**Required employees to report issues, workload on project manager**
Top management support	Visible top management support	**Lack of top management engagement among employees, culture of leadership, weak management**
	Steering group's ability to understand the need for an ERP system	Lack of familiarization with the day-to-day operations, their focus on economy instead of production
	Sending a unified message	Different leadership styles among top managers, lack of consideration of cultural heritage
Training and education	Give adequate training	**Lack of digital competence in computer usage.** Unstructured approach, training not personalized, late involvement, on-the-job training focused on solving issues instead of learning how to solve them, neglect prior knowledge
Vision for change	Identify the need for a unified vision	**Different perceptions of benefits among top management, focus on personal instead of organizational benefits, lack of end-user involvement**

Table 2. Overview of key findings, the most prominent reasons for the challenges are marked in bold.

5   Analysis and discussion of key findings

The culture was a reason for why many of the challenges identified at Mech were difficult to handle. In general, culture may be either a facilitator or a major impediment to change (Razmi et al., 2009). The culture present at Mech proved to be more of an impediment than a facilitator for change management. At Mech, the incorporated culture involves accepting workarounds, resisting change, and working in silos. There have been few changes over the last decade, and the company's business processes have mostly remained the same. Therefore, an ERP implementation, in addition to organizational growth, challenged the incorporated culture. Previous research demonstrates that a culture where employees share common values and goals and are receptive to change, is important for successful change management in ERP projects (Kim et al. 2016; Nah et al. 2001).

Furthermore, corporate culture should share common goals over individual pursuits, and emphasize the value of trust between employees and managers (Razmi et al. 2009). Such a culture for shared goals and trust lacked at Mech. The cultural inheritance was neglected and not satisfactorily thought throughout the implementation. Overall, we saw that this affected Mech's ability to create a commitment to change and company support vital for ERP success (Schniederjans and Yadav 2013). With a lack of commitment and support comes some level of organizational resistance, which led to some challenges in conducting training sessions. In addition, a certain amount of resistance to change is expected with ERP implementations, the project manager, or a project champion, should accept and deal with it rather than to go into denial (Malhotra and Temponi 2010). The top management both accepted and denied the culture through different approaches deployed by managers. Thus, there was no unified message communicated, which we argue made it further challenging to prepare the organization for the change.

In this ERP implementation, lack of deep engagement was the reason behind several of the challenges observed. These challenges are again related to specific CSFs that companies need to be aware of during an ERP implementation. The ones that were most affected by it were communication, training and education, organizational resistance management, and end-user involvement. Management's ability to obtain feedback and input from employees through interaction is an important influence for success in ERP implementations (Hustad and Olsen 2014; Snider et al. 2009). Further, it is important to include end-users of the system because they might have valuable input (Hasheela-Mufeti and Smolander 2017).

Many challenges were created due to Mech's lack of effort to understand and interact with employees to obtain this kind of input and feedback. First, it affected communication by making it challenging to know how much information is sufficient as they did not know employees' varying levels of knowledge about ERP systems. Second, it affected training and education by making it difficult for them to know how much training and education the employees needed. Third, it affected resistance management, as parts of the resistance was not noticed or confronted due to lack of interaction with employees. Fourth, it affected end-user involvement because of input from employees was very limited. In addition, not all end-users of the system were included, with some interviewees claiming they knew nothing about the implementation and how it would affect them. Lastly, we believe that risk management was, to some degree, affected by lack of deep engagement as the highest risks in ERP implementations for SMEs are people-related issues (Malhotra and Temponi 2010). Due to lack of engagement with the users, much of the people-related issues were not as easy to identify and, therefore, never included in the risk matrix.

Mech performed an ad-hoc ERP implementation approach for many of the project activities, which caused a series of interconnected challenges. However, this approach is not unusual for SMEs as the small distances between employees and leadership in the company typically allow for more informal and close communication (Malhotra and Temponi 2010). The main CSFs this reason affected were project management, planning, management of expectations, and risk management. For risk management, it was difficult to mitigate and avoid risks as the ad-hoc approach made Mech reactive instead of proactive. Thus, it became difficult for project management to address problems as they often had to tackle the consequences of it, and not the problem itself. For planning, it was difficult for them to stick to the original plan as different problems emerged which the ad-hoc approach facilitated. This had several positive effects as the approach put them in a position to tackle emerging problems. However, as they

were usually reactive instead of proactive, the consequences were managed instead of the problem itself. The importance of being proactive by planning far ahead is emphasized in previous research (Hasheela-Mufeti and Smolander 2017). While Mech started planning far ahead at an early point, the ad-hoc planning quickly took control, and the initial plan was not followed. The ad-hoc approach made it difficult to prioritize the company's resources for the project as the prioritization decisions were often made on the spot. As a result, the project team often had to prioritize their daily tasks. Furthermore, this led to difficulties in managing the expectations of employees as they could not carry out the close follow-up of the end-users as was initially promised. It is argued that giving employees expectations that are not fulfilled or that are unrealistic can create unforeseen consequences (Shaul and Tauber 2012). In this case, this resulted in an increased resistance among the employees, increasing the challenges of the resistance management CSF, and a strengthening of the gap between management and operations.

During the implementation period, Mech experienced an all-time high workload during the ERP-project because of organizational growth. As the ERP implementation was structured like a matrix project, it became difficult for employees to prioritize whether they should work on daily operations, or the project-related tasks. Also, due to the all-time high workload, the daily operations stole project resources. This created several challenges for Mech, such as ensuring continued commitment to the project, and worn-out employees. High workload affected several CSFs such as company support, training and education, risk management, project management, and project teams.

Successful ERP implementations, require continual support from leadership (Dezdar and Ainin 2011). Assuring continual commitment from leadership became challenging in Mech due to their tasks being split between project and daily operations, in addition to the increased workload. Due to the customer demands, managers had to direct more focus on daily operations. This ultimately affected the project management and resulted in the loss of a holistic project view as the project manager, who was the only one with the holistic view, got so much additional responsibility that he could not keep track of everything. Furthermore, the workload affected Mech's risk management. Much like with project management, the management of risks was mainly the project manager's responsibility. As the project manager progressively received additional responsibility, in addition to his role as the project manager, risk management consequently received less focus. Therefore, the loss of attention to risk management was due to limited resources. However, as SMEs typically have limited resources, it makes the risk assessment more important as SMEs must make compromises upon carefully assessed risks (Shaul and Tauber 2012), which is the opposite of what happened at Mech.

The need to prioritize resources also caused challenges for training and education. Companies often underestimate the amount of training that is necessary (Umble et al. 2003), which Mech did with their previous ERP implementation. Therefore, they decided to give training and education additional attention this time. However, parts of the training were cut out due to the workload, and the practical and actual usage of SYS2 was not included in the training that employees received. This caused the training to become abstract, and individuals that were less confident with computers were not adequately trained. In addition, the training sessions were not necessarily tailored towards the individuals. Instead, the same training was given to all employees, with some minor differences between the different departments.

Training is very important when it comes to fully exploiting the functionality of a system (Shaul and Tauber 2012). As Mech did not focus properly on training, they risk that the users will work around the system (Boudreau and Robey 2005), and that they will not be able to utilize the system properly. However, due to the loss of holistic view and loss of ability to act proactively upon risks, these challenges were not handled in risk management.

Lack of holistic project view was a challenge. From the start of the project, the only one with a holistic project view was the project manager. As described earlier, the workload resulted in the loss of a holistic view. This created several challenges during the ERP implementation relating to CSFs such as risk management, vision for the change, company support, and top management support.

First, this reason created different perceptions of what the change would mean to employees and the company. Therefore, the vision shifted towards personal instead of organizational benefits. Vision for

change is important in ERP implementations because it gives direction to the project and drives the change forward (Jiwasiddi and Mondong 2018; Somers and Nelson 2004). The lack of such a vision, therefore, made it challenging to give direction and drive the change forward. However, our analysis shows that many employees realized that Mech needed to make a change, which has made this challenge manageable.

Lack of involvement of employees in the project has led to several challenges. These challenges are ensuring continual support, getting feedback and input, giving adequate training, involving all end-users, and providing sufficient information. All in all, this reason affected five different CSFs, which are company support, end-user involvement, training and education, communication, and BPR.

This lack of involvement made it hard for employees to give feedback and input on the project, as many did not know whom to give it to. Mech may have missed out on valuable input as end-users often have valuable insights and feedback (Hasheela-Mufeti and Smolander 2017). ERP users should be heavily involved in reengineering due to their importance for success in such projects (Schniederjans and Yadav 2013). It is also recommended that companies engage in collaboration across departments for reengineering processes (Kwak et al. 2011). This has not been the case in Mech as most users were involved late in the project, and they did not have any input on the reengineering of processes. If Mech had done this, it could have helped ease the challenge of adapting to new processes as employees would feel committed to the change. The late involvement of employees may, therefore, have increased the challenges of BPR.

The management style (weak management) during the ERP implementation created challenges. It mainly affected CSFs such as top management support, end-user involvement, communication, and project management. Lack of understanding of project management fundamentals may cause negative consequences for the company (Ehie and Madsen 2005; Hustad and Olsen 2014). These are fundamentals such as focusing on objectives, tracking of project planning, and resources (Reitsma and Hilletofth 2018). One of the main contributors to these challenges is the different leadership styles among the managers. This has made it challenging to send a unified message to employees as often different messages were communicated from different managers. Previous research suggests that the success of an ERP implementation is dependent upon the commitment from leadership (Dezdar and Ainin 2011). Also, leadership must be supported by the rest of the company (Schniederjans and Yadav 2013). While Mech has the support it needs from top management, some employees have proven to show some resistance towards the leadership. Also, while the top management support has been present, many employees claimed it was not there at all. This shows that there is a disconnect between what has happened and what employees experienced. Making the top management support visible has been challenging for Mech.

The management style also affected communication. For instance, the information meetings did not have mandatory attendance except for the first introduction. This increased the challenge of informing them about the change as some would not show up, causing frustration among managers. The management style also made it challenging to prioritize the resources properly as employees often responded to both line managers and project managers.

Lack of competence in computer usage. Historically Mech has not used computers as part of the day-to-day operations except for on management level. This has manifested itself as a part of the culture at Mech and created several challenges when implementing the ERP system. This reason has made it challenging for employees to adapt to the new processes that are a part of the ERP system. Their lack of experience with computers causes them to try to avoid using it, and therefore they also avoid the new processes. This has made the work with BPR very challenging, as failing to adapt processes to the ERP system can cause poor utilization of the system's potential (Žabjek et al. 2009). Furthermore, as employees did not use computers daily, many did not see the need to use it now either, making it challenging to gain full company support. The lack of experience with computer usage, in combination with varying management of expectations, made it challenging to give employees realistic expectations of the system usage.

6   Conclusion and implications

In sum, we conducted a case study in an SME which was in the process of implementing an ERP system. Our purpose was to respond to the following RQs: *(1) How do SMEs manage change during ERP implementations? and (2) Why is change management challenging to tackle during ERP implementations in SMEs?*

This study contributes to the literature focusing on change management in ERP-implementations in SMEs. More specifically, it contributes to the emphasizing on people-related issues, rather than technical-related issues, for achieving successful ERP implementation. Also, it provides increased and rich insight into *how* and *why* change management is challenging in an SME context by detailing eight key reasons behind 33 challenges. We put forward that lessons learned from this study can be beneficial for other SMEs to avoid the problems and pitfalls revealed. These should be considered in developing countermeasures to support a more successful outcome of an ERP implementation.

Previous research has highlighted different CSFs which may vary in their relative importance. However, some CSFs were highlighted as more important than others, such as communication and training (Park 2018). This study also contributes to the CSFs literature of ERP implementation, and details why the CSFs are important to manage, and it presents insight into eight key reasons that make change management challenging. It details the importance of considering culture, overall organizational workload, and ensuring deep engagement, which receives little attention in previous research. A specific context may affect the relative importance of CSFs (Snider et al. 2009), and this study provides rich insight into how such challenges were unfolded in a specific context providing evidence that ERP implementations should consider the extensive organizational change it causes.

We focused on critical success factors and challenges in tackling change management in this context. Through an inductive analysis, we identified several reasons for difficulties in handling change management challenges. Through our observations of the challenges, we found some CSFs to be more important than others due to the severity and number of challenges related to them. These were BPR, communication, top management support, company support, and training and education. We also found that BPR opposed the established culture at Mech, due to the fundamental changes it led to in the organizational structure, tasks, and responsibilities. BPR, therefore, became increasingly challenging as the changes were comprehensive, and the culture led to a lot of resistance towards it.

We found risk management to be essential but underestimated in this ERP implementation, as handling it could have given Mech significant benefits that would have positively affected many of the other CSFs. Furthermore, we found the culture to be the reason for many of the challenges that Mech faced, as there was a culture for opposing change and avoid responsibility. We argue that if the organizational culture were adequately considered, it might instead facilitate the change, instead of being a hindrance. Lack of deep engagement also created some challenges as the lack of input and feedback from employees left managers unaware of employees' knowledge and needs.

This research study has some limitations, providing opportunities for future research. We conducted a study in one SME, and it will be important to extend the study to involve several SMEs to verify the importance of certain CSFs and how change management can be tackled to achieve a successful ERP implementation. Especially future research should pay attention to the influence of organizational culture during ERP implementation. Moreover, previous literature discusses how to conduct successful change management by detailing CSFs that managers should pay attention to. However, we identified a lack of consensus on the relative importance of these CSFs. We also need more comparative studies revealing the most important CSFs for SMEs and large companies and what are differences between SMEs and large companies in this sense. It is argued that the contextual setting affects their importance (Snider et al. 2009). We therefore propose studies focusing on change management of ERP-implementations across industries to be an interesting avenue for further research. Further studies should also investigate how different CSFs interact. Finally, we propose researchers to examine the reasons for change management challenges regarding CSFs, instead of ranking the CSFs.

References

Achanga, P., Shehab, E., Roy, R., and Nelder, G. 2006. "Critical Success Factors for Lean Implementation within Smes," *Journal of manufacturing technology management* (17:4), pp. 460-471.

Akkermans, H. A., Bogerd, P., Yücesan, E., and Van Wassenhove, L. N. 2003. "The Impact of ERP on Supply Chain Management: Exploratory Findings from a European Delphi Study," *European Journal of Operational Research* (146:2), pp. 284-301.

Akkermans, H. A., and Van Helden, K. 2002. "Vicious and Virtuous Cycles in ERP Implementation : A Case Study of Interrelations between Critical Success Factors," *European Journal of Information Systems* (11:1), pp. 35-46.

Al-Mashari, M., Al-Mudimigh, A., and Zairi, M. 2003. "Enterprise Resource Planning: A Taxonomy of Critical Factors," *European Journal of Operational Research* (146:2), pp. 352-364.

Aladwani, A. M. 2001. "Change Management Strategies for Successful ERP Implementation," *Business Process Management Journal* (7:3), pp. 266-275.

Ali, M., and Miller, L. 2017. "ERP System Implementation in Large Enterprises – a Systematic Literature Review," *Journal of Enterprise Information Management* (30:4), pp. 666-692.

Almajali, D. A., and Tarhini, A. 2016. "Antecedents of ERP Systems Implementation Success: A Study on Jordanian Healthcare Sector," *Journal of Enterprise Information Management* (29:4), pp. 549-565.

Boudreau, M.-C., and Robey, D. 2005. "Enacting Integrated Information Technology: A Human Agency Perspective," *Organization Science* (16:1), pp. 3-18.

Cartan-Quinn, M., and Carson, D. 2003. "Issues Which Impact Upon Marketing in the Small Firm," *Small business economics* (21:2), pp. 201-213.

Davenport, T. H. 1998. "Putting the Enterprise into the Enterprise System," *Harvard Business Review* (76:4), pp. 121-131.

Dezdar, S., and Ainin, S. 2011. "The Influence of Organizational Factors on Successful ERP Implementation," *Management Decision* (49:6), pp. 911-926.

Doom, C., Milis, K., Poelmans, S., and Bloemen, E. 2010. "Critical Success Factors for ERP Implementations in Belgian Smes," *Journal of Enterprise Information Management* (23:3), pp. 378-406.

Drummond, P., Araujo, F., and Borges, R. 2017. "Meeting Halfway: Assessing the Differences between the Perceptions of ERP Implementers and End-Users," *Business Process Management Journal* (23:5), pp. 936-956.

Ehie, I. C., and Madsen, M. 2005. "Identifying Critical Issues in Enterprise Resource Planning (ERP) Implementation," *Computers in industry* (56:6), pp. 545-557.

Eisenhardt, K. M. 1989. "Building Theories from Case Study Research," *The Academy of Management Review* (14:4), pp. 532-550.

Esteves, J., and Pastor, J. 2006. "Organizational and Technological Critical Success Factors Behavior Along the ERP Implementation Phases," in *Enterprise Information Systems Vi,* I. Seruca, J. Cordeiro, S. Hammoudi and J. Filipe (eds.). Springer Netherlands, pp. 63-71.

European, C. 2020. "What Is an Sme?", from https://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en

Finney, S., and Corbett, M. 2007. "ERP Implementation : A Compilation and Analysis of Critical Success Factors," *Business Process Management Journal* (13:3), pp. 329-347.

Grabski, S. V., and Leech, S. A. 2007. "Complementary Controls and ERP Implementation Success," *International Journal of Accounting Information Systems* (8:1), pp. 17-39.

Grover, V., Jeong, S. R., Kettinger, W. J., and Teng, J. T. C. 1995. "The Implementation of Business Process Reengineering," *Journal of Management Information Systems* (12:1), pp. 109-144.

Hasheela-Mufeti, V., and Smolander, K. 2017. "What Are the Requirements of a Successful ERP Implementation in Smes? Special Focus on Southern Africa," *International Journal of Information Systems and Project Management* (5:3), pp. 5-20.

Hidayanto, A. N., Hasibuan, M. A., Handayani, P. W., and Sucahyo, Y. G. 2013. "Framework for Measuring ERP Implementation Readiness in Small and Medium Enterprise (Sme): A Case Study in Software Developer Company," *J. Comput.* (8:7), pp. 1777-1782.

Huq, Z., Huq, F., and Cutright, K. 2006. "Bpr through ERP: Avoiding Change Management Pitfalls," *Journal of Change Management* (6:1), pp. 67-85.

Hustad, E., and Olsen, D. H. 2014. "ERP Implementation in an Sme: A Failure Case," in *Information Systems for Small and Medium-Sized Enterprises: State of Art of Is Research in Smes,* J. Devos, H.v. Landeghem and D. Deschoolmeester (eds.). Springer, pp. 213-228.

Iacovou, C. L., Benbasat, I., and Dexter, A. S. 1995. "Electronic Data Interchange and Small Organizations: Adoption and Impact of Technology," *MIS quarterly*), pp. 465-485.

Jiwasiddi, A., and Mondong, B. 2018. "Analysing ERP Implementation Critical Success Factors for Sme: A Study of Sap One Implementation in Jakarta," *Pertanika Journal of Social Sciences & Humanities* (26), pp. 139-146.

Kim, H.-W., and Kankanhalli, A. 2009. "Investigating User Resistance of Information Systems Implementation: A Status Quo Bias Perspective," *MIS Quarterly* (33:3), pp. 567-582.

Kim, A. A., Sadatsafavi, H., and Kim Soucek, M. 2016. "Effective Communication Practices for Implementing ERP for a Large Transportation Agency," *Journal of Management in Engineering* (32:3), p. 04015049.

King, S. F., and Burgess, T. F. 2006. "Beyond Critical Success Factors: A Dynamic Model of Enterprise System Innovation," *International Journal of Information Management* (26:1), pp. 59-69.

Kotter, J. P. 2007. "Leading Change: Why Transformation Efforts Fail," *Harvard Business Review* (85:1), pp. 96-103.

Kvale, S., and Brinkmann, S. 2009. *Interviews: Learning the Craft of Qualitative Research Interviewing*. Los Angeles, Calif.: Sage.

Kwak, Y. H., Park, J., Chung, B. Y., and Ghosh, S. 2011. "Understanding End-Users' Acceptance of Enterprise Resource Planning (ERP) System in Project-Based Sectors," *IEEE Transactions on Engineering Management* (59:2), pp. 266-277.

Laudon, K. C., and Laudon, J. P. 2020. *Management Information Systems: Managing the Digital Firm*. New York University: Pearson.

Lee, G. G., and Pai, J.-C. 2003. "Effects of Organizational Context and Inter-Group Behaviour on the Success of Strategic Information Systems Planning: An Empirical Study," *Behaviour & Information Technology* (22:4), pp. 263-280.

Luo, W., and Strong, D. 2004. "A Framework for Evaluating ERP Implementation Choices," *IEEE Transactions on Engineering Management* (51:3), pp. 322-333.

Malhotra, R., and Temponi, C. 2010. "Critical Decisions for ERP Integration: Small Business Issues," *International Journal of Information Management* (30:1), pp. 28-37.

Markus, M. L. 2004. "Technochange Management: Using It to Drive Organizational Change," *Journal of Information technology* (19:1), pp. 4-20.

Miles, M. B., Huberman, A. M., and Saldaña, J. 2018. *Qualitative Data Analysis: A Methods Sourcebook*. Sage publications.

Momoh, A., Roy, R., and Shehab, E. 2010. "Challenges in Enterprise Resource Planning Implementation: State-of-the-Art," *Business Process Management Journal* (16:4), pp. 537-565.

Moon, Y., B. 2007. "Enterprise Resource Planning (ERP): A Review of the Literature," *International Journal of Management and Enterprise Development* (4:3), pp. 235-264.

Motwani, J., Subramanian, R., and Gopalakrishna, P. 2005. "Critical Factors for Successful ERP Implementation: Exploratory Findings from Four Case Studies," *Computers in Industry* (56:6), pp. 529-544.

Nah, F. F. H., Lau, J. L. S., and Kuang, J. 2001. "Critical Factors for Successful Implementation of Enterprise Systems," *Business process management journal* (7:3), pp. 285-296.

Naslund, D. 2004. "The Importance of Culture and Change Management in Planning for an ERP Implementation," *Supply Chain Forum: An International Journal* (5:1), pp. 24-36.

Ngai, E. W. T., Law, C. C. H., and Wat, F. K. T. 2008. "Examining the Critical Success Factors in the Adoption of Enterprise Resource Planning," *Computers in Industry* (59:6), pp. 548-564.

Park, K. O. 2018. "The Relationship between Bpr Strategy and Change Management for the Sustainable Implementation of ERP: An Information Orientation Perspective," *Sustainability* (10:9), p. 3080.

Ranjan, S., Jha, V. K., and Pal, P. 2016. "Literature Review on ERP Implementation Challenges," *International Journal of Business Information Systems* (21:3), pp. 388-402.

Razmi, J., Sangari, M. S., and Ghodsi, R. 2009. "Developing a Practical Framework for ERP Readiness Assessment Using Fuzzy Analytic Network Process," *Advances in Engineering Software* (40:11), pp. 1168-1178.

Reitsma, E., and Hilletofth, P. 2018. "Critical Success Factors for ERP System Implementation: A User Perspective," *European Business Review* (30:3), pp. 285-310.

Ribbers, P. M. A., and Schoo, K.-C. 2002. "Program Management and Complexity of ERP Implementations," *Engineering Management Journal* (14:1), pp. 45-52.

Robey, D., Ross, J. W., and Boudreau, M.-C. 2002. "Learning to Implement Enterprise Systems: An Exploratory Study of the Dialectics of Change," *Journal of Management Information Systems* (19:1), pp. 17-46.

Schniederjans, D., and Yadav, S. 2013. "Successful ERP Implementation: An Integrative Model," *Business Process Management Journal* (19:2), pp. 364-398.

Shaheen, G. 2016. "Resistance to Change in Implementation of ERP Projects," *Journal of Strategy and Performance Management* (4:1), pp. 24-38.

Shaul, L., and Tauber, D. 2012. "Csfs Along ERP Life-Cycle in Smes: A Field Study," *Industrial Management & Data Systems* (112:3), pp. 360-384.

Shin, I. 2006. "Adoption of Enterprise Application Software and Firm Performance," *Small Business Economics* (26:3), pp. 241-256.

Snider, B., da Silveira, G. J., and Balakrishnan, J. 2009. "ERP Implementation at Smes: Analysis of Five Canadian Cases," *International Journal of Operations & Production Management* (29:1), pp. 4-29.

Soh, C., and Sia, S., Kien. 2005. "The Challenges of Implementing " Vanilla" Versions of Enterprise Systems," *MIS Quarterly Executive* (4:3), pp. 373-384.

Somers, T. M., and Nelson, K. G. 2001. "The Impact of Critical Success Factors across the Stages of Enterprise Resource Planning Implementations," *The 34th Hawaii International Conference on Systems Sciences (HICSS-34)*.

Somers, T. M., and Nelson, K. G. 2004. "A Taxonomy of Players and Activities across the ERP Project Life Cycle," *Information & Management* (41:3), pp. 257-278.

Stapleton, G., and Rezak, C. J. 2004. "Change Management Underpins a Successful ERP Implementation at Marathon Oil," *Journal of Organizational Excellence* (23:4), pp. 15-22.

Saade, R. G., and Nijher, H. 2016. "Critical Success Factors in Enterprise Resource Planning Implementation: A Review of Case Studies," *Journal of Enterprise Information Management* (29:1), pp. 72-96.

Todnem By, R. 2005. "Organisational Change Management: A Critical Review," *Journal of change management* (5:4), pp. 369-380.

Umble, E. J., Haft, R. R., and Umble, M. M. 2003. "Enterprise Resource Planning: Implementation Procedures and Critical Success Factors," *European Journal of Operational Research* (146:2), pp. 241-257.

Van Hau, T. T., and Kuzic, J. 2010. "Change Management Strategies for the Successful Implementation of Enterprise Resource Planning Systems," *2010 Second International Conference on Knowledge and Systems Engineering*: IEEE, pp. 178-182.

Volkoff, O., Strong, D., and Elmes, M. 2007. "Technological Embeddedness and Organizational Change," *Organization Science* (18:5), pp. 832-848.

Walsham, G. 1995. "Interpretive Case Studies in Is Research: Nature and Method," *European Journal of Information Systems* (4:2), pp. 74-81.

Walsham, G. 2006. "Doing Interpretive Research," *European Journal of Information Systems* (15:3), pp. 320-330.

Willis, T. H., and Willis-Brown, A. H. 2002. "Extending the Value of ERP," *Industrial Management & Data Systems* (102:1), pp. 35-38.

Yin, R., K. 2003. *Case Study Research: Design and Methods*. Thousand Oaks, CA: Sage Publications.

Žabjek, D., Kovačič, A., and Štemberger, M. I. 2009. "The Influence of Business Process Management and Some Other Csfs on Successful ERP Implementation," *Business Process Management Journal* (15:4), pp. 588-608.