Journal of Leadership and Management 16 (2020) 1-17
ISSN: 2391-6087

Cabell's Listed

Managing Successful Information Systems Implementations at Small and Medium Enterprises
Managerial IS Implementation Effectiveness Theory

U. Yeliz Eseryel
Department of Management Information Systems, College of Business,
East Carolina University, USA

Deniz Eseryel
Department of Teacher Education and Learning Sciences, College of Education,
North Carolina State University, USA

Jeroen Wolters
University Medical Center Groningen,
the Netherlands

Abstract

Small and Medium Enterprises (SMEs) are crucial for the economies of countries in Europe, Asia, Middle East and South America. Management practices in information systems require different approaches for SMEs than in large companies. Yet, most management research takes place in US-based large companies. Information systems implementations fail more than 70% of the time, and implementing enterprise systems is so risky and costly that their failure may cause many small and medium enterprises (SMEs) to go out of business. Business managers' involvement and decision are key to the success of information systems implementations. In this study, we develop an information systems implementation effectiveness theory for managers at small and medium enterprises (SMEs) where managers implement minimally customized information systems. Extant research has not taken investigated the influence of enterprise size, or the level of system customization. In this study, we empirically test the influence of the level of system customization on success factors by surveying 216 small and medium enterprises. We adapt the implementation climate theory and extend this theory by adding systems customization as a mediating variable. We find that for implementation effectiveness of low customized ERP systems at small and medium enterprises, managers should pay more attention to developing motivation systems and to empowering the project team. We find that these factors are even more important for success than implementation climate, project management skills and information systems structure.

Keywords: management of IS implementations, motivation system, project team empowerment, ERP Systems, ERP Critical Success Factors, Small Enterprises, Limited Customization, CSF, on-premise ERP, SME

Correspondence address:
U. Yeliz Eseryel, Ph.D.
Assistant Professor
College of Business
330 Slay Hall, Greenville, NC 27858-4353,
252-737-1042, USA
e-mail: yeliz@eseryel.com

Article info:
Available online:
30 November 2020
Editor: Adam Szpaderski

Journal information:

Journal homepage:
www.leadership.net.pl

1. Introduction

As information systems implementations fail more than 70% of the time, managers are often interested in critical success factors for information systems implementations. Management of these implementations is key to the success of the organization. This topic is important not only for the information technology (IT) managers, but also non-IT business managers since developing a strong non-IT business leadership team is required for an organization is to succeed with such large scale IT projects (Eseryel, 2019).

Due to high competition, and the need to integrate systems within a company and with suppliers and customers of a company, enterprise-wide systems such as Enterprise Resource Planning systems have become a requirement at small and medium size enterprises (SMEs) as well. However, to avoid high cost and high risk of these systems, often times limiting customization is recommended for

small and medium size enterprises. While much investigation has been done at large companies to guide the managers on which factors to pay attention to, there is a large gap in literature that guides the managers of SMEs. In this study, we develop managerial IS implementation effectiveness theory based on an empirical study on on-premise enterprise resource planning (ERP) implementations in small and medium enterprises (SMEs) which limit their customization.

(On-premise) ERP system is a business management system that comprises integrated sets of comprehensive software, that helps manage and integrate business functions within an organization with a rationalized data architecture that integrates core processes and shares product and/or customer databases (Ross, Weill and Robertson, 2006). Allied Market Research estimates the whole global ERP market to be worth $41.69 billion by 2020 (Chaudhari and Ghone, 2015). The reason behind the enormous growth of ERP system implementations is that these implementations increase operational efficiency and transparency within organizations, thereby providing competitive edge to companies (Chaudhari and Ghone, 2015). The major challenges that today's companies have to deal with are operational complexity and rapid changes in business models. One strategy that organizations take to overcome such challenges is adopting ERP systems (Chaudhari and Ghone, 2015). Figure 1 shows the reasons companies indicate for implementing an ERP system.

Many challenges are involved with managing a non-premise ERP system implementation at SMEs. In the survey ran by Statista in 2017, 64% of the ERP implementation projects experienced cost overruns, 79% of them experienced duration overruns (Statista, 2017), which may cause devastation for SMEs, which typically have smaller budgets and low tolerance of large financial risks. Thus, much research has been done for helping managers of Fortune 500 companies focus on the critical success factors (CSFs) for ERP implementation effectiveness (Ahmad and Cuenca, 2013).

Three key gaps in the literature require and justify this study: First, the extant research was mainly conducted with large companies such as Fortune 500 companies in the US, which limits the lessons that managers of small and medium size companies can gather, because the structures, needs and processes of small and medium size companies differ highly from those of Fortune 500 companies. Second, empirical verification is typically lacking in this research stream, since the authors focus mainly on examining managers' opinions regarding a factor's importance for ERP project instead of verifying the actual influence of the factors on the managers' implementation success (Soja,

Figure 1. Reasons for implementing ERP
Source: Panorama Consulting Solution's 2017 ERP Report.

2006).Third, most of the investigations are US-based, which makes it difficult to translate key management lessons for European SME managers: The SMEs in the United States are twice as large. While Europe defines SME's a organizations with 250 and under, the United States defines them as 500 members and under. This means that some of the SME research in the US are actually with large companies according to European standards. Finally, in Europe, Latin America and in Asia, SMEs play a key role in the economy, compared to the small role they play in the American economy.

Small and medium size enterprises include organizations which employ fewer than 250 people (Schmiemann, 2008) and have either an annual turnover that does not exceed 50 million Euros and/or annual balance sheet that does not exceed 43 million euros (European Commission, 2016). European Union Commission emphasizes that SMEs are not only about the size. SMEs are really unique in that SME managers and leaders face challenges that are not faced by the managers and leaders of larger organizations such as financial challenges that make it very hard for them to obtain venture capital, to conduct research or invest in innovations, or comply with environmental regulations. Furthermore, SME managers need to overcome structural barriers such as lack of management and technical skills, rigidities in labor markets and limited knowledge of opportunities for expansion (European Commission, 2016: 4). The critical success factors that managers should focus on for implementation effectiveness in SMEs are important to identify, because of the SMEs role in the economy. In Europe, SME's drive economic growth and job creation by generating two out of every three jobs. SMEs constitute 9 out of 10 enterprises and in 2013 they 21 million SMEs provided 88.8 million jobs in the European Union (European Commission, 2016). SMEs also contribute hugely to the economic development of Asian countries such as Malaysia (Mui, Basit and Hassan, 2018). SMEs may choose an on-premise ERP system to ensure control over their data, customize their system for processes that give them competitive advantage and ensure higher security and privacy (Miller, 2018).

While almost all large enterprises have implemented some type of on-premise ERP system, SME managers have only recently started to implement ERP systems to improve efficiency and to become and stay competitive. The implementation of ERP systems in small and medium size enterprises (SMEs) has increased during the last decade (Ahmad and Cuenca, 2013). SMEs uniquely differ in their size and operations, thus, managing ERP implementations require different focus in SMEs than in Fortune 500 companies (Haddara, 2018). For example, the costs associated with the implementation of an ERP system hinder small enterprises to adopt such a system (Ahmad and Cuenca, 2013). Since SME managers face challenges in integration of on-premise ERP solutions, a growing number of vendors focus primarily on small enterprises or are expanding their business to the small organizations (Venkatraman and Fahd, 2016). Moreover, the financial, structural and managerial challenges mentioned earlier are quite relevant challenges with respect to on-premise ERP implementations. Indeed, Venkatraman and colleagues (2016) list the following three on-premise ERP constraints for as the key ones for SME's managers: (1) managing the resource intensive nature of the on-premise ERP's (the workforce allocation, intensive training, and gaining top management commitment), (2) managing the long implementation time-frames and (3) managing the high cost of ERP implementations. Furthermore, on-premise ERP implementations require specialized technical know-how, and strong management, which are among the key limitations of SMEs by definition (European Commission, 2016). The best industry know-how on implementation are typically provided by expensive third-party/consulting firms. Yet, utilizing such know-how poses high financial risk to SMEs, who tend to be already financially volatile.

For the reasons explained above, SME managers even when they choose to implement on-premise ERP systems, tend to limit the customization of their ERP systems. However, low levels of customization may cause misalignments (Soh and Sia, 2005) or misfits (Hustad, Haddara and Kalvenes, 2016) between the ERP system and the organization, because systems are designed based on standardized business processes. Misalignment is defined as the differences between the structures embedded in the ERP system and those embedded in the organization (as a reflection of rules, norms and procedures) (Soh and Sia, 2005). Any ERP implementation requires a fit between the implemented system and the processes in the organization that the system supports (Robey, Ross and Boudreau, 2002). Creating such fit requires the SME managers to work with the whole organization to reengineer all or most of its processes. Since effective business process reengineering requires different managerial skills, a different response from the organization and a different team climate, it would be too unrealistic to expect the same critical success factors to apply equally to highly-customized ERP system implementations of Fortune 500 companies and low-customized ERP implementations used by SMEs. Yet, extant literature disregards these fundamental differences and suggests that

managerial skills and the focus of the managers should be the same, regardless of the organizational type, size and the level of system customization. The level of customization influences system complexity, speed of implementation, costs, complexity of business process reengineering, level of organizational change and role changes. Therefore, we argue that the critical success factors for low-customized and highly-customized ERP implementations may not require the same managerial focus. More specifically if we want to determine the critical success factors that the SME managers should focus on, we need to identify the critical success factors that are applicable for low-customized ERP implementations.

In this study, therefore, we have two research questions. Namely, "Which critical success factors should SMEs' managers' focus on to ensure on-premise ERP implementation effectiveness?" and "How does customization of on-premise ERP systems influence the relationship between Critical success factors and ERP implementation effectiveness in SMEs?"

2. Theory Development

2.1. Our Approach to Theory Development

"Nothing is so practical as a good theory" (Lewin, 1951: 169). Our goal with this study is to contribute to theory development and at the same time provide the SME managers with very practical suggestions on which critical success factors to focus. To accomplish that, we adapt the Implementation Climate Theory to ERP implementation team setting and combine it with the critical success factor literature for SMEs. In the next sections, we introduce the critical success factors relevant to ERP systems, and specifically to SMEs. This is followed by a discussion of ERP customization level. Lastly, we discuss our theoretical framework, namely the "managerial information systems implementation effectiveness theory". We explain the elements of the theory and introduce our hypotheses.

2.2. Critical Success Factors for SMEs

Recent studies showed that enterprises perceive difficulties with achieving benefits from the implemented ERP systems. Research of Finney and Corbett (2007) on ERP implementations concluded that ERP implementation could lead to failure or even complete abandonment of the system. In the survey ran by Statista in 2017, 64% of the ERP implementation projects experienced cost overruns, 79% of them experienced duration overruns (Statista, 2017). Since ERP implementation challenges have been faced for the last two decades, a very productive research line on critical success factors has taken place.

Rockhart (1979) developed the concept of identifying critical success factors, to make sure that managers pay attention to the necessary factors. These key areas must be managed exceedingly well for a company to be successful. "Critical success factors thus a limited number of areas in which results, if they are satisfactory, will ensure effective competitive performance for the organization" (Rochart, 1979: 85). The identification of the critical factors for the implementation of ERP systems has been well defined in the existing literature (Ahmad and Cuenca, 2013). Identifying critical success factors became a popular method to help improve the chance of ERP implementation success (Ifinedo, Udo and Ifinedo, 2010). Managers should not attempt to succeed in all factors, since the factors are not equally important during ERP implementations. Managers should be aware that when they attempt an ERP implementation, implementation difficulties and high rates of failure come with the territory (Corkindale and Ram, 2014).

Not all implementations are the same. Managers need to pay attention different factors when organizational characteristics such as enterprise size, and implementation scope change (see for example, Soja, 2006). Soja (2006) aimed at identifying differences in critical success factors that the managers should focus on for small and large firms, implying that not all factors that were relevant to large companies are equally important during ERP implementations in SMEs. They identified managers with experience in ERP implementations, from both companies that lead implementation projects, and from those that supply ERP systems. In a questionnaire, Soja asked them to identify the key factors that these managers perceived to be the most important to the success of the implementation. Soja's study presents a valuable starting point, since it identifies the factors that the managers with expertise view as being the key success factors. However, having a conclusive study require additional quantitative studies, since the quantitative testing of the findings were limited to correlation testing between the average rank given to these factors and the implementation success. What they found with this simple analysis was that factors that were correlated significantly to success differed between large and small companies. In our study, we will use the critical success factors identified by managers and test these factors using appropriate statistical analysis in SME's, so that the implementation managers of on-premise ERPs at SMEs can focus on the relevant factors to ensure effective systems implementation.

Table 1. Factors and factor descriptions

Factor	Factor Description Comments
ERP Implementation Team Climate	
(A1) Project manager	An individual from the organization who spends most of his/her working time to oversee the implementation.
(A2) Co-operation with supplier	Good co-operation with the system supplier who is competent and offers high levels of services.
(A3) Fast effects	The visible, fast, partial, positive results of the implementation.
Implementation Skills	
(B1) Implementation goals	The definition of implementation goals in economic terms at the organization-wide level.
(B2) Pre-implementation analysis	Organization analysis and diagnosis prior to the start of implementation, and the creation of the organization functioning model with the integrated system support.
(B3) Monitoring and feedback	Information exchange between the project team and end-users.
Incentives	
(C1) Incentive system	A reward system encouraging participation in implementation and on-time task delivery.
Project Team Empowerment	
(D1) Project team empowerment	The empowerment of the project team members to make decisions and their high position in the organization hierarchy.
Information System Structure	
(E1) IT infrastructure	The appropriate IT infrastructure assured for the implementation project.
(E2) Legacy systems	The legacy systems adaptation for the operation in the ERP integrated system environment.

Note: adapted from Soja (2006) within the Implementation Effectiveness Framework of Klein and Sorra (1996).

2.3. ERP Customization Level

Parr and Shanks (2000) identified three different implementation strategies for managers. These three categories are: "comprehensive", described as the technically most ambitious implementation approach where the system is fully customized, "vanilla" as the least technically risky, where no customization is done to the system other than module selection, and "middle-road", which lies in between the two approaches. Managers should view implementation strategies as a continuum where vanilla implementation and comprehensive customization are the two extreme ends of the customization, and the companies may choose either the extremes or anywhere between the two extremes (Figure 2).

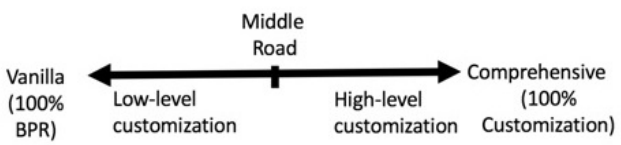

Figure 2. Levels of on-premise ERP customization

Managers' choice on the type and extent of ERP customization is crucial and determines the level of fit between the business needs and ERP functionalities, and may influence implementation effectiveness (Hustad et al., 2016). For the business managers, the implications of customization are as follows: The system customization(i.e., moving in the direction of comprehensive implementation) may bring about technical challenges to the IT staff due to customization of the software code. Comprehensive implementations bring managers the challenge of managing higher costs, higher levels of financial risks and technical complexity (Hong and Kim, 2002; Parr and Shanks, 2000; Sia and Soh, 2007). On the other hand, moving towards the vanilla implementation requires business process reengineering, which means that the staff needs to change the way they work and to even change their roles in the organization (Hong and Kim, 2002). Such major organizational change requires management of change in a systematic way to eliminate fear and rejection of new technology. Most importantly, managers need to ensure proper training and reskilling efforts are in place for current and future employees. Therefore, low-level system customization brings about many managerial challenges and requires much systematic intervention in terms of dealing with major change in how individuals work.

Low levels of system customization is advised to minimize the risk in organizations and is mostly used in small and medium organizations (Parr and Shanks, 2000). The

assumptions and challenges of level of system customization differ so much that a distinction needs to be made between factors leading to the success for both ways of achieving a fit (Parr and Shanks, 2000). Different factors leading to implementation success are to be expected for achieving a system-process fit. Despite the differences in the type of managerial challenges that business process reengineering and system customization pose, there is no research that differentiates the critical success factors that managers of small and medium enterprises should focus on for different levels of customization. More specifically, no study to our knowledge investigated how system customization affects critical success factors' influence on implementation effectiveness. With this study, we intend to fill in this gap.

2.4. Theoretical Framework for ERP Implementations

Several theories have been adopted to increase our understanding of the implementation process. Examples of such implementation theories are: implementation climate theory (Klein and Sorra, 1996), absorptive capacity (Zahra and George, 2002), organizational readiness (Weiner, 2009), COM-B (Capacity-Opportunities-Motivation-Behavior) (Michie, van Stralen and West, 2011), and normalization process theory (May and Finch, 2009). Some of these theories, such as the implementation climate theory (Klein and Sorra, 1996), have been developed by modifying certain features of existing theories or concepts concerning organizational climate, and culture (Nilsen, 2015).

As mentioned earlier, most ERP research stemmed from the practical needs for managers to avoid implementation failures, and to identify best practices that managers can use based on previous experience with on-premise ERP implementations. These studies are invaluable in terms of contribution to practice, and yet often, most such publications have not advanced theory. The implementation climate theory allows us, to include within its framework critical success factors (Soja, 2006), which have been identified specifically for on-premise ERP implementations by

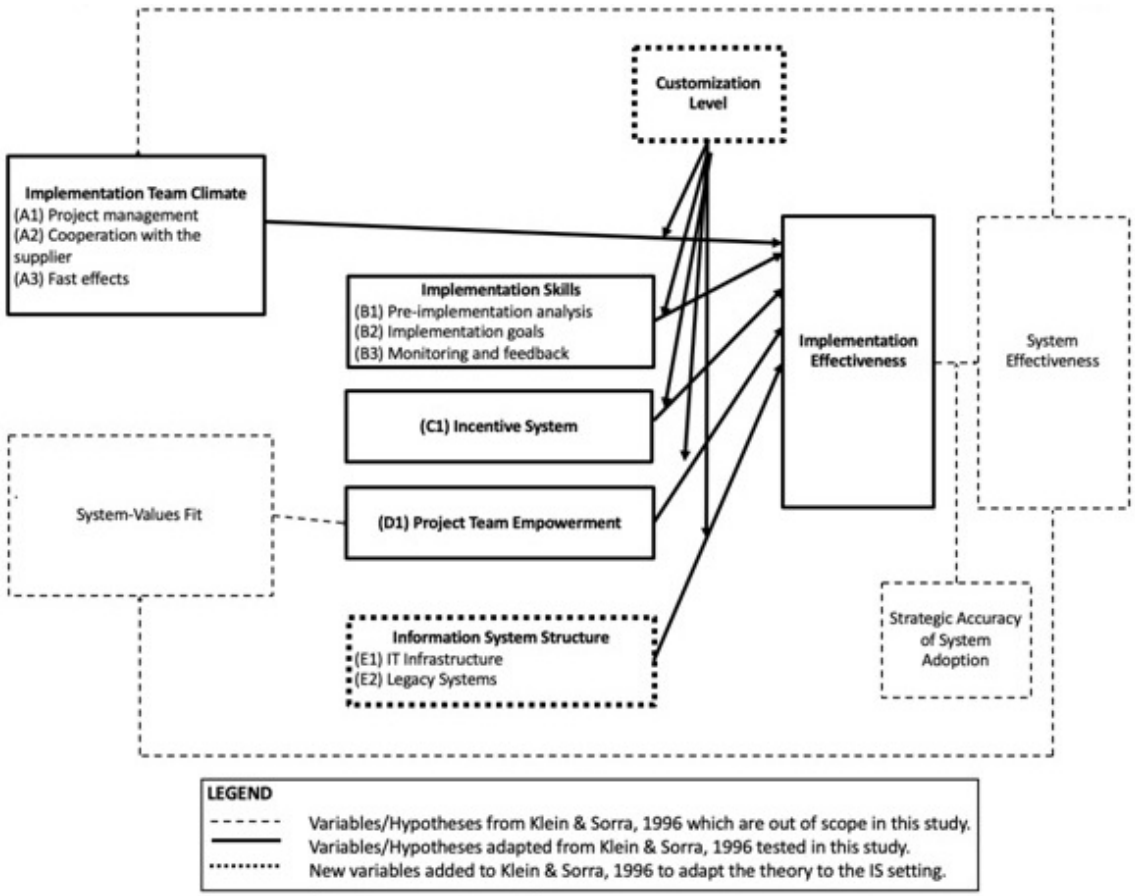

Figure 3. Managerial IS implementation effectiveness theory

Note: adapted from Klein and Sorra, 1996, p. 1056.

SMEs, but not yet quantitatively tested. By adapting implementation climate theory to ERP implementation by using critical success factors, we hope to contribute both to the advancement of theory, and to provide useful suggestions for practitioner managers.

2.5.Managerial IS Implementation Effectiveness Theory

The managerial IS implementation effectiveness theory is adapted from the implementation climate theory, which was developed based on a review of the literature on innovation implementation (Klein and Sorra, 1996). ERP implementation can be seen as an example of process innovation in that ERP implementation either changes the systems used by managers and staff, or it causes managers to reengineer their business processes. Two types of stage models are commonly used to describe innovation processes (Klein and Sorra,1996): source-based or user-based models. While the first one utilizes the perspective of the developer of the innovation, the second one focuses on the perspective of the user of the innovation. For this study, we adapted this theory to the information systems setting (Figure 3). To adapt the theory to ERP implementation setting, we needed to move the theory's perspective from end-users to the implementation project team. ERP implementation teams tend to be large teams that may include IS people, consultants, and business managers and their staff, who are the eventual users of the system. Within the small and medium size enterprises, implementation project teams may include key managers, key users, even key top management members, depending on the size of the enterprise. Using a stage model that takes the perspective of the implementation-team is needed in order to combine the framework with the critical success factors approach, which increases the practical applicability of the theory. Figure 4 shows the hypotheses we develop for this model, as explained below.

2.6. ERP Implementation Team Climate

In this section, we explain the hypothesis formation (Figure 4). Schneider's (1990: 384) conceptualization of the climate includes the project team's "perceptions of the events, procedures and practices that are supported

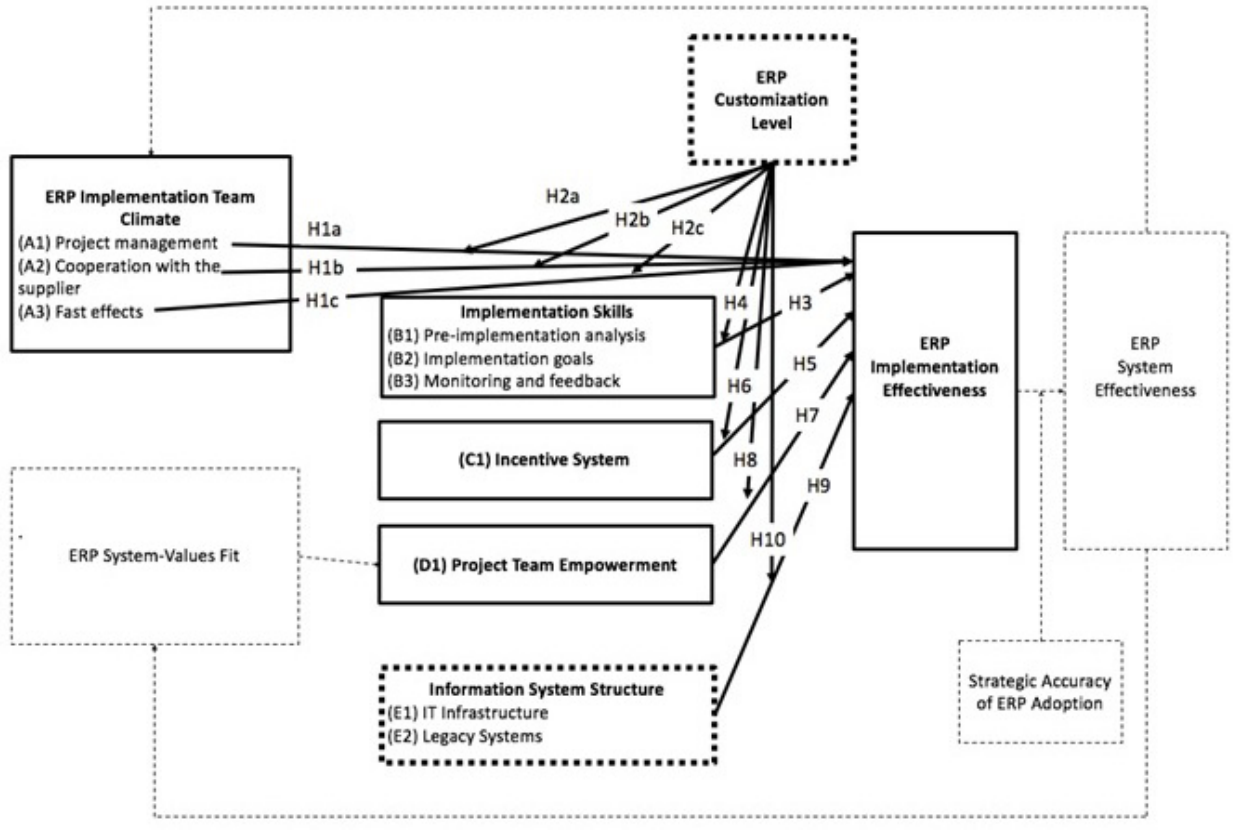

Figure 4. Hypotheses

and expected in a setting". Schneider's conceptualization of climate focuses on the events and managerial practices that promote behaviors consistent with a specific strategic outcome of interest, in this case, effective ERP implementation. In their review of the implementation climate literature, Klein and Sorra (1996) found a variety of different organizational and managerial practices that may impact innovation. Applying this to the ERP implementation team setting, the practices that support a team climate that is conducive to effective implementation include (1) formal project management, and (2) co-operation with the ERP system supplier. Both of these are positive practices showing a supported and positive implementation climate, whereas in enterprises whose top management does not support the implementation may not provide these key resources to the implementation project. The more supportive the team climate is for the execution of a project, the more effective we expect the project effectiveness to be.

The last element of team climate is fast effects. The first two elements referred to the climate practices, as mentioned in Schneider's conceptualization of climate. Fast effects, on the other hand, refer to the positive events that shows to the team that the implementation is supported by the organization. Fast effects allow us to operationalize positive implementation team climate because the concept refers to quick, partial and highly visible successes as perceived by the team members during the implementation. As the implementation team members experience success, they become more motivated to contribute, and therefore we expect the implementation effectiveness to increase. Therefore, we expect that:

H1: The implementation team climate is positively associated with implementation effectiveness in SMEs. The elements of implementation team climate include H1(a) project manager, H1(b) co-operation with supplier and H1(c) fast effects.

We expect these elements to be moderated by ERP customization level. This is because, low-customized ERP systems require higher involvement of and collaboration among the recipients and the supplier to increase the adaptation to the systems (Soh and Sia, 2005).

Formal project management role is highly needed in cases of low customization. This is because low customization accompanies high levels of business process reengineering, which in turn requires strong buy-in for change from within the organization. Such buy-in would be received through various meetings by the project manager. Furthermore, project manager would facilitate coordination among different functions to decide on the best end-to-end business processes.

We posit that in the implementation of low-customized on-premise ERP systems, fast effects' influence on ERP implementation effectiveness will increase because such positive views can motivate the business process reengineering efforts that are required by low-customized systems, which generally receive resistance by the team. This leads to the following hypothesis:

H2: The positive influence of implementation team climate on implementation effectiveness is positively moderated by low levels of customization. The elements of implementation team climate include H2(a) project manager, H2(b) co-operation with supplier and H2(c) fast effects.

2.7. Implementation Skills

To achieve implementation success, a strategic vision is necessary which aligns the implementation with the organizational goals (Aladwani, 1999). This is needed to align the ERP implementation with the strategic goals of the organization. Kamhawi (2007) identified several factors as influencers of ERP system implementations. The category of strategic factors which builds a case for conducting pre-implementation analysis, which allows goal-setting for the project, implementation goal setting, and then monitoring these goals and getting feedback are in line with the factors in this category. These researchers showed that by setting goals, members are more likely to monitor and troubleshoot which lead to higher project effectiveness in combination with other factors in their study. According to Parr and Shanks (1999), inappropriate scope management is a threat to the project effectiveness. Therefore, having the right implementation skills would result in a more effective ERP implementation:

H3: Implementation skills are positively associated with implementation effectiveness is negatively moderated by low levels of system customization. The implementation skills include H3(a) pre-implementation analysis, H3(b) implementation goals, and H3(c) monitoring and feedback.

H4: The positive influence of implementation skills on implementation effectiveness is negatively moderated by low levels of system customization. The implementation skills include H4(a) pre-implementation analysis, H4(b) implementation goals, and H4(c) monitoring and feedback.

2.8. Incentive System

When employees are not sufficiently motivated towards ERP implementation, that brings about resistance to change and resistance to the implementation of ERP system (Venkatraman and Fahd, 2016). In Soja's study, the existence of a motivation system is identified by the experts to be an important contributor to successful ERP implementations. We expect that resistance to change within an organization would be higher, in cases where organization reengineers existing business processes. Therefore, we expect that as organizations choose to limit their customization of the ERP system, this would bring about more business process reengineering, which would in turn increase the organizational resistance to change. These situations would increase the importance of an appropriate incentive system. Therefore, we developed the following two hypotheses:

H5: Appropriate incentive system is positively associated with implementation effectiveness in SMEs.

H6: The positive influence of appropriate incentive system on implementation effectiveness is positively moderated by low levels of system customization.

2.9. Project Team Empowerment

Project team empowerment is one of these factors and relates to team members who are empowered to make decisions. Parr and Shank (2003) reveal that in ERP implementation organizations run risks such as lack of adequate control over increased responsibilities. The empowerment of lower level employees must always be done during the implementation (Parr and Shank 2003). Without this empowerment, the organization might have inadequate control, because the members with relevant specific knowledge do not have the right to decide. The importance of project team empowerment is especially crucial for low levels of customization, since in this case, the team members need to take ownership of business processes. They need to be empowered to make decisions on changing business processes. These result in the following hypotheses:

H7: Project team empowerment is positively associated with implementation effectiveness.

H8: The positive influence of project team empowerment on implementation effectiveness is positively moderated by low levels of system customization.

2.10. Information Systems Structure

IT infrastructure consists of re-useable and shareable resources, which provides bases for present and future IT applications (Duncan, 1995). IT systems with standard application architecture provide an infrastructure that supports business flexibility for change such as ERP implementations (Parr and Shank, 2003). Thus, the current IT infrastructure has its influence on ERP implementations and can support this. As seen in the case study provided by (Hustad et al., 2016), when the legacy systems make it difficult for organizations to move to an on-premise ERP system, enterprises will need to customize their ERP system further. Thus, while inflexible legacy systems influence ERP effectiveness negatively, they also require higher levels of customization. Therefore, we developed the following hypotheses:

H9: Appropriate information system structure is positively associated with implementation effectiveness. The information system structure includes H9(a) IT infrastructure, H9(b) Legacy systems.

H10: The positive influence of appropriate information system structure on implementation effectiveness is positively moderated by low levels of system customization. The information system structure includes H10(a) IT infrastructure, H10(b) Legacy systems.

2.11. ERP Implementation Effectiveness

In our theoretical model, the distinction is made between ERP implementation effectiveness and ERP system effectiveness.

ERP implementation effectiveness is achieved when the on-premise ERP implementation project is completed on time and within budget, and in a manner, that meets the requirements, which were identified at the beginning of the project. Most on-premise ERP systems have return on investment planning that realistically takes a number or years to achieve. This is because it takes time for increased process efficiencies to compensate the large cost of on-premise implementation. Moreover, these returns are received if the on-premise ERP implementation was indeed a strategic decision. Therefore, ERP system effectiveness may take a few years to achieve, and it is out of the scope of this study. Yet, we have kept it in the model, shown by dashed lines, to promote further research, and to stay consistent with the original implementation climate theory. Similarly, the effectiveness of the implemented ERP-system feeds

back into the ERP system-values fit and for positive implementation team climate in cases of future implementations or upgrades. These are also indicated with dashed lines in Figures 3-5.

3. Research Method

Critical success factors can be researched using both quantitative and qualitative approaches. In newer, undeveloped fields, it is best to start the investigation with qualitative approaches to attain rich information. Since the area of critical success factors for ERP implementations is a mature literature field (Schlichter and Kraemmergaard, 2010), while not all relations among the concepts have been ultimately identified, quantitative research method is a better fit (van Aken, Berends, and van der Bij, 2007). This method fits this research since it converts phenomena into numeric values so that a statistical analysis can be conducted which enables the exploration of causal relations among variables (Gelo, Braakmann and Benetka, 2008). By studying a representative research sample, we are trying to identify relations and to provide generalizable statements (Gable, 1994) about critical success factors in SMEs.

3.1. Data Collection and Sample Description

We first piloted the study with five individuals and made minor verbiage changes to increase the understanding of the instructions based on the feedback.

After the pilot study, we distributed our questionnaire to individuals based on two criteria. Our first criterion was at the organization level and related to the implementation history. Namely, a small enterprise with fewer than 250 employees had to have an ERP implementation within the last 5 years. Secondly, we attempted to identify individuals who were key informants of the study in that they were knowledgeable about the ERP implementation and were willing to share their knowledge with us. Huber and Powere (1985) state that if one respondent per organization is questioned, the person who is knowledgeable about the issue of interest, in this case ERP implementation, needs to be identified. Therefore, we instituted the following second criterion: namely, the person participating in our research needed to be either leading the implementation or needed to be highly involved in it.

To reach respondents involved in ERP implementations, a general e-mail was sent to 3075 small enterprises asking if there were any implementations in the last five years. Contact information was obtained via Orbis Database, which is owned by a Moody's Analytics company, and contains information on over 200 million companies worldwide. We first identified SMEs (N<250) with e-mail addresses available in Orbis. Responding SMEs were emailed to ask for contact information of those involved in their ERP implementation. Additionally, 54 ERP vendors were contacted to ask if they wanted to assist in distributing the questionnaire. This resulted in 326 contact people involved in implementing ERP systems in different SMEs. These individuals received an email with a link to our anonymous survey using Qualtrics.

The data was gathered during a period of four weeks. One person per organization filled in the questionnaire and this was confirmed by checking the participants' IP-addresses. This led to 219 valid respondents (67% response rate) and 194 completed surveys (89%). The average organization size was 60 employees. The organization size ranged from 2 to 249 employees with a mode of 15 organizations with 20 employees. The organizations operated in the fields of agriculture, machine industry, metal industry, marketing, construction, maritime electronics, and other fields.

3.2. The Measures

This study aims at researching three concepts and the relationship. All study measures are adopted from well validated measures (see appendix A for measurement items and the sources). One control variable is added based on the literature, namely organization size.

Dependent Variable. Implementation effectiveness is the dependent variable in this research. This concept consists of four partial measures. In this study, following Hong and Kim (2002), we measured ERP implementation effectiveness in terms of deviation from expected project goals such as cost overrun, schedule overrun, system performance deficit and failure to achieve expected benefits. We adopted a validated seven-item Likert-type scale running from (1) strongly disagree to (7) strongly agree, to measure the extent to which respondents agree with statements about the four items of implementation effectiveness. Example item for this concept is: "The ERP project took significantly longer than expected".

Moderating Variable. To measure ERP customization level, we asked five questions, in line with Gattiker and Goodhue (2005), and Chou and Chang (2008). Implementation strategies range on a continuum from high system customization, where the system is altered to high business

process customization, which represents changes in the organization. The 5 questions in our questionnaire were measured by a seven-item Likert scale running from (1) strongly disagree to (7) strongly agree (Brooke, 2013). A sample item is: "The ERP system was altered to improve its fit with this plant".

Independent Variables. The independent variables in this research are the Critical Success Factors, presented in Table 1. Originally, Soja (2006) identified 26 potential critical success factors. We reduced the number of relevant factors based on correlations among factors. We eliminated all factors with high correlations (>.30), which left 10 potential critical success factors presented earlier in Table 1. To measure the presence of critical success factors during the implementation, respondents rated their answers using a five-item Likert scale ranging from (1) I strongly disagree to (5) I strongly agree, in line with Soja (2006). In Soja's (2006) research, experts were asked their views on whether they found particular factors, that were identified based on literature review, important for implementation. Soja also asked experts to estimate the occurrence of the factors during ERP implementations. In our research, we asked respondents if these factors were present during the implementation to analyze the relationship of the factors to implementation effectiveness quantitatively. Thus, while Soja has done the valuable research of identifying important factors based on the experience and opinions of experts, our investigation has tested these opinions to identify which of these factors influence ERP implementations effect. A sample item from our questionnaire is: "There was good co-operation with the system supplier who is competent and offers high level of services". One ERP system implementation manager (or knowledgeable and actively involved participant) has answered these questions for their recent ERP system implementation, which took place within the previous 5 years.

Control Variable. We measured firm size using natural logarithm of the number of employees in the organization as the control variable in this research, in line with the research of Premkumar and Roberts (1999), who found that organization size influences IT adoption. We provide the measurement items and sources in the appendix. Only SMEs with fewer than 250 employees were included in this research.

3.3. Data Analysis

We used hierarchical linear regression analysis to test the hypotheses in this research. We used the least squares regression analysis to determine whether the relationship between the dependent and independent variables are moderated by a third variable. The least squares regression analysis was appropriate for our data, since it has a simple conceptual model and gives accurate estimations of the correlation (Crawford, 2006; Natrella, 2010). The purpose of a regression analysis is to determine whether there is a causal relationship between the dependent variable and the independent factors (Field, 2013). We conducted hierarchy testing to see if the success factors helped explain implementation success more than only the control variable, which is ideal for theory-based hypotheses.

4. Results

Before the data could be used to test the hypotheses, validity and reliability were tested. The success measure was normalized and added up to measure the implementation success (Hong and Kim, 2002). All reversed items were

Table 2. Correlation Matrix

Factor	(A1)	(A2)	(A3)	(B1)	(B2)	(B3)	(C1)	(D1)	(E1)	(E2)
(A1) Project management	1.0									
(A2) Co-operation with supplier	.03	1.0								
(A3) Fast effects	.06	**.30****	1.0							
(B1) Pre-implementation analysis	-.03	.05	**.25****	1.0						
(B2) Implementation goals	.00	-.02	.03	.04	1.0					
(B3) Monitoring and feedback	.09	.07	**.30****	**.23****	.03	1.0				
(C1) Incentive system	.11	-.10	.09	.07	-.05	-.01	1.0			
(D1) Project team empowerment	.09	.14	**.23****	.09	.05	.12	-.08	1.0		
(E1) IT infrastructure	**.23****	.09	**.24****	**.24****	.03	**.22****	.01	**.15***	1.0	
(E2) Legacy Systems	.07	-.05	.01	.06	.05	.15	**.17***	-.04	-.08	1.0

** Significant P<.01 level
* Significant P<.05 level

recoded. A principal factor analysis on single item scale was done and this measure will be retained for the constructs implementation success and system customization. Multicollinearity diagnostic test was executed to test the inter-correlatedness of the independent variables (Grewal, Cote, and Baumgartner, 2004). Table 2 presents the correlation matrix of the 10 independent variables.

All scales were reliable, with Cronbach Alphas of .68 for both constructs. The principal factor analysis for implementation success showed values ranging from .65 to .76 and therefore the construct satisfies the criteria. Consequently, all items referring to implementation success were used in the analysis. For system customization, the factor analysis showed values ranging between .55 and .77 and thus items measuring the level of system customization were used.

Table 3. Descriptive statistics

Factor	Mea	Std. Dev.	N
(A1) Project management	3.51	1.15	190
(A2) Co-operation with supplier	3.43	1.07	189
(A3) Fast effects	3.12	.90	190
(B1) Pre-implementation analysis	3.18	.92	190
(B2) Implementation goals	3.51	.92	190
(B3) Monitoring and feedback	3.15	.93	189
(C1) Incentive system	2.83	.98	189
(D1) Project team empowerment	3.94	.71	190
(E1) IT infrastructure	3.73	.81	189
(E2) Legacy Systems	2.98	1.11	190

Since the presence of factors was measured on a single item scale, no additional analysis needed to be done to prepare the data for hypotheses testing. To test these factors with the interaction terms, these variables are mean centred to minimize the risk for multicollinearity (Aiken and West, 1991; Cohen, Cohen, West and Aiken, 2013).

Table 3 presents the descriptive statistics. Descriptive statistics show that (D1) project team empowerment (4.20) was the factor most present during ERP implementations in SMEs, followed by (E1) IT infrastructure (3.99), (B1) pre-implementation analysis (3.76) and (B3) monitoring and feedback (3.56). (C1) incentive system (1.68) was the factor that was the least present during ERP implementations in SMEs. For all factors, the correlation coefficient between the level of factor occurrence and implementation effectiveness were calculated. Interaction terms were created to test the influence of the moderator.

The regression coefficients were used to examine the hypotheses. Multicollinearity diagnostic test indicates that there were no multicollinearity problems in the regression models. Whereas upper-limit VIF scores range from 2.0 to 10.0 (Cohen et al., 2013), VIF scores in this study range between 1.07 and 1.64. Table 4 shows the result of the hierarchical regression analysis. Model 1 contains the control variable, size of the organization and has a R-square of .00 and an insignificant F statistic.

Model 2 includes the control variable organizational size and the 10 factors which could be critical success factors for low customized ERP system implementations in SMEs. The R-square of Model 2 is .39 and the F statistic is 8.46. In Model 3, the 10 interaction terms are added and this model is used to test the moderating variables. The R-square of Model 3 is .48 and the F statistic is 5.8. Model 3 is a significant improvement over Model 2.

Hypothesis 1, the positive relationship between ERP implementation team climate and ERP Implementation effectiveness is partially supported. Project management has a negative influence on implementation effectiveness (β=-.17, $p<.05$).

Cooperation with the supplier positively influence (β=.19, $p<.05$) on implementation effectiveness. Fast effects positively influence (β=.61, $p<.05$) implementation effectiveness.

Hypothesis 3, the positive relationship between implementation skills and implementation effectiveness is partially supported. Pre-implementation analysis positively influences implementation effectiveness (β=.22, $p<.05$). Implementation goals and monitoring and feedback do not have a significant relationship to implementation effectiveness.

Hypothesis 7, the positive relationship between team empowerment and implementation effectiveness is supported (β=.26, $p<.05$).

Hypothesis 8, the positive influence of project team empowerment on implementation effectiveness is positively moderated by low levels of system customization, is supported (β=.26, $p<.05$).

Hypotheses 2, 4, 5, 9, and 10 were not supported.

This means that, for implementations with low levels of system customization and thus, high levels of business

	Model 1		Model 2		Model 3	
	Coefficient Estimate	SE	Coefficient Estimate	SE	Coefficient Estimate	SE
Implementation effectiveness	**4.24*** **	.13	0.6	.64	-.16	.68
Level of system customization					.01	.00
(A1) Project management			**-.16** **	.07	**-.17** **	.07
(A2) Co-operation with supplier			**.27** ***	.09	**.19** **	.09
(A3) Fast effects			**.58** ***	.10	**.61** ***	.10
(B1) Pre-implementation analysis			.16	.10	**.22** **	.10
(B2) Implementation goals			-.03	.07	-.01	.07
(B3) Monitoring and feedback			.03	.10	.04	.10
(C1) Incentive system			.03	.11	.18	.11
(D1) Project team empowerment			.14	.11	**.26** **	.11
(E1) IT infrastructure			**.22**	.16	.22	.16
(E2) Legacy Systems			.00	.08	.01	.92
Project management * customization level					-.06	.06
Co-operation with supplier * customization level					-.05	.08
Fast effects * customization level					.02	.10
Pre-implementation analysis * customization level					-.02	.11
Implementation goals * customization level					.07	.07
Monitoring and feedback * customization level					-.14	.09
Incentive system * customization level					**.38** ***	.10
Project team empowerment * customization level					**.26** **	.12
IT infrastructure * customization level					.10	.18
Legacy systems * customization level					.08	.08
Firm Size	.00	.00	.00	.00	.00	.00
F value	.07		8.46		5.80	
R^2	.00	1.2	.39	.93	.48	.88

Note: Dependent variable: Implementation success. Model 1; control variable, Model 2; direct relation of CSF on implementation success, Model 3; moderated relations of CSF on implementation success, Model 3; moderated relations of CSF on implementation success.

S.E: Standard Error

*Significant at P<.01,

**Significant at P<.05.

Table 4. Hierarchical regression analysis

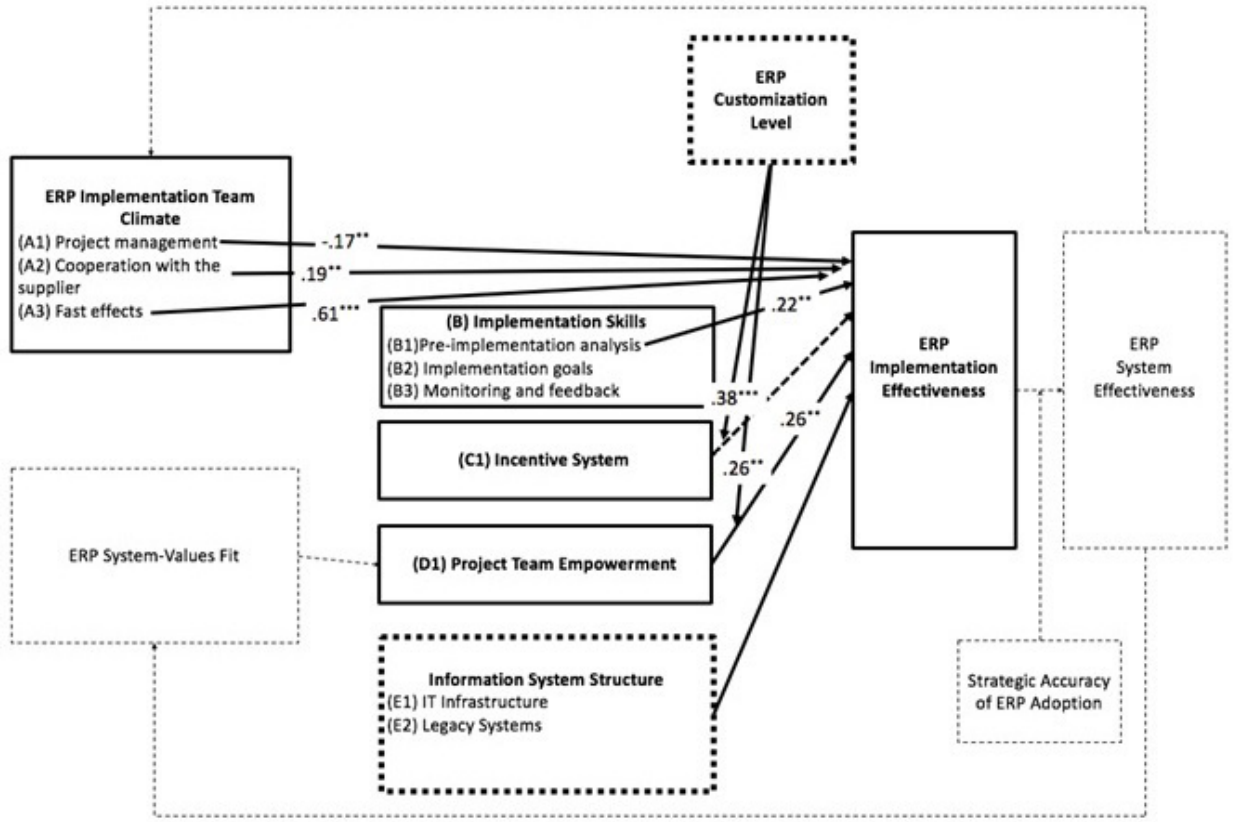

Figure 5. Findings

process reengineering, some factors are more important compared to implementations with higher levels of system customization. This is the case for the factor incentive system (H6) where the relationship is positively influenced by low levels of system customization ($\beta = .38$, $p < .01$). For low levels of system customization, the positive influence of incentive system on implementations effectiveness is higher. Thus, the empirical findings support H6.

A second factor for which lower levels of system customization increase the positive effect on implementation effectiveness, is project team empowerment ($\beta = .26$, $p < .05$). With lower levels of system customization, this factor increases the chance of implementation effectiveness more than in implementations of more customized systems.

5. Discussion

Our key contribution to the theory is the introduction of "Managerial information systems Implementation Effectiveness" theory. We adapted this theory to the Information systems context from the implementation climate theory within the innovation research (Figure 3). We have successfully adapted this theory to implementation team perspective and used it in the ERP systems implementation setting.

Our contribution to ERP systems research is showing how CSF research applies truly differently for SMEs that implement on-premise ERP systems. Moreover, the level of customization influences which factors should be focused on for effective implementations.

We find that managers at SMEs should focus on implementation team climate, namely cooperating with the supplier and aiming for fast effects (i.e., quick and visible wins earlier in the project), conducting pre-implementation analysis, and empowering project teams.

Critical success factors research have been abundantly conducted in the last two decades, and the factors proposed by researchers covered a wide range of aspects, representing various levels of generalization, which may contain up to twenty or more elements (Soja, 2006). The importance of the factors identified in this study stem from the fact that many factors that have been identified by researchers as being critical to an implementation's success do not seem to be applicable to SMEs that implement on-premise ERP systems. Having started off with 26 factors, our research found that in addition to implementation team climate and project team empowerment, a single project skill (namely pre-implementation analysis) is important for ensuring implementation success.

For SME managers who choose for limiting their customization of on-premise ERP systems, we showed that there are specific critical success factors leading to successful implementations. This is true for 2 out of the 10 tested factors identified by Soja (2006), namely (C1) incentive system and (D1) project team empowerment. Our research shows that these two factors are more important whenever on-premise ERP system customization is limited at SMEs.

Although non-significant direct relation is found in this research, incentive system is assumed to be important during less customized system implementations. This is the case as users tend to push for system customization because they want to reduce the amount of change they have to make (Soh and Sia, 2005). Participation in less customized implementations is therefore lower than in more customized implementations. Incentive systems which reward involvement will increase participation and will therefore be more important during the implementation of systems that poses lower levels of system customization. Based on the findings, the assumption can be made that this factor is underestimated since it is the factor that was least present in the sample. Small enterprises implementing a low-customized on-premise ERP system can take advantage of this underestimated factor.

The influence of project team empowerment on implementation success is also higher for cases where system customization is low. The importance of project team empowerment, specifically that of non-IT managers was mentioned by other authors (e.g., Eseryel, 2019)before, however in cases where system was highly customized. The direct relation between project team empowerment and implementation success is also significant. This supports previous research, because empowerment leads to motivation, energizes (Thomas and Velthouse, 1990) and increases engagement (Jose and Mampilly, 2015). Organizational members would rather see the system change, than have to changes their routines (Soh and Sia, 2005). This result supports the study of Levin, Mateyaschuk and Stein (1998), who found that the empowerment of project team members is key to ERP implementation success, without testing the influence of the implementation strategy on this relation.

One may ask what happened to well-known critical success factors for not only ERP implementations, but also IS projects in general, such as "top management support". Our

finding was the most interesting in this area. Among the critical success factors identified by Soja's informants were top management support, top management awareness, as well as team composition and team involvement, which would have been appropriate to be included in this study. Soja identified these factors by asking the users and suppliers of ERP system the critical success factors they seemed to find relevant to implementation success. However, these four factors correlated strongly and significantly with project management, thus we kept only project management in this area, for theoretical parsimony. And most curiously, we found that having a formal project manager effected the implementation effectiveness significantly negatively (β=-.17, $p<.05$). We can only hypothesize that a formal project management role, or top management support, in this case would indicate the perception among the implementation team members, as "us versus them" environment, perhaps unnecessary formalization given the small employee size within organizations. It is also possible that a formal project management role may be outsourced, given the specific skills required by on-premise ERP system implementation, which is likely not found in such small organizations. To remind the reader, the average organization in our sample had 60 employees. The number of employees ranged from 2 to 249 employees with a mode of 15 organizations with 20 employees.

6. Conslusion

This study investigated the following research questions: "Which critical success factors should SMEs' managers' focus on to ensure on-premise ERP implementation effectiveness?" and "How does customization of on-premise ERP systems influence the relationship between Critical success factors and ERP implementation effectiveness in SMEs?"

This research makes two theoretical contributions. The first is that out of the factors identified by Soja (2006), the 10 relevant factors are empirically tested in the SME context. Also, the research considers the moderating role of the level of customization on the relationship between critical success factors and implementation success.

The second contribution is that this research confirmed that ERP implementations cannot be seen as a generic concept. The results show that the factors influencing ERP implementation success should be examined considering the different implementation strategies. It is important to make a distinction between business process and system customization since these implementation strategies have different critical success factors.

Future research should add various components of managerial information systems implementation effectiveness theory that have not been tested here, such as system effectiveness, system-values fit, and strategic accuracy of system adoption. Furthermore, this theory should be tested with other challenging IS implementations, within organizations of various sizes.

There's an increasing focus on the measurement of IS outcomes based on the customer value and social value (Petter, 2008). In this study, we measured implementation effectiveness, and did not collect data on ERP system effectiveness. Future studies that collect data on system effectiveness (the rightmost box in our model in Figure 5) may specifically consider benefits to developers, users, managers, and other stakeholders such as customers, employees, suppliers, stockholders, vendors and governments (Petter, 2008).

As with all quantitative research, future research could increase the generalizability of these findings by involving a larger sample size.

While our paper is aimed at SME's, we utilized European Union's SME definition. This definition is as follows: Small and medium size enterprises (SME)s are enterprises which employ fewer than 250 people and have either an annual turnover that does not exceed 50 million Euros and/or annual balance sheet that does not exceed 43 million euros (European Commission, 2016) For larger countries, such as the Australia, our sample may be considered "small enterprises". One area of future research would be to test the findings in SMEs of different cultures, for example using Hofstede's classification, to see if the Critical success factors that apply to SMEs differ across these cultures or whether Critical success factors are stable across different cultures.

Soja (2006) selected the factors tested in this study after a thorough literature review focused on small enterprises. Yet, other factors might be relevant too, such as the use of steering committee, use of vendors tools (Somers and Nelson, 2001), leadership and commitment (Al-Mashari, Al-Mudimigh and Zairi, 2003) or organizational culture. Hence, future research could include more factors that might be relevant during implementations, or only factors specifically selected for SMEs to see the applicability of these for smaller companies.

By adding the implementation strategies as a new concept in the discussion on critical success factors in ERP implementations, many opportunities for future research emerge. Future research should aim at further investigating the concept of low levels of system customization. Also, it remains an interesting empirical question as to whether our findings generalize to larger firms since this research has focused solely on small organizations. It is also interesting to see under which circumstances less system customized systems would add value in larger firms.

In this study, we examined the moderating effect of the level of system customization. Markus, Axline, Petrie and Tanis (2000) describe four different phases during ERP implementations. Future research should aim to investigate in which stage each critical success factor has its crucial role and if there is an influence of different implementation strategies on these factors in different phases. A research like this could provide a better guidance to practitioners in the planning of an ERP implementation.

References

Ahmad, M. M., and Cuenca, R. P. (2013). "Critical Success Factors for ERP Implementation in SMEs." *Robotics and Computer-Integrated Manufacturing*, 29(3), pp. 104–111. doi:10.1016/j.rcim.2012.04.019.

Aiken, L. S., and West, S. G. (1991). *Multiple Regression: Testing and Interpreting Interactions*. Thousand Oaks: Sage Publications, Inc.

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. doi:https://doi.org/10.1016/S0377-2217(02)00554-4.

Brooke, J. (2013). "SUS – A Quick and Dirty Usability Scale." *Usability Evaluation in Industry*, 8(2), pp. 4–7.

Chandy, R. K., and Tellis, G. J. (2000). "The Incumbent's Curse? Incumbency, Size, and Radical Product Innovation." *Journal of Marketing*, 64(3), pp. 1–17.

Chaudhari, S., and Ghone, A. (2015). "ERP Software Market by Deployment and Function." *High Tech, Enterprise & Consumer IT*.

Chou, S.-W., and Chang, Y.-C. (2008). "The Implementation Factors that Influence the ERP (Enterprise Resource Planning) Benefits." *Decision Support Systems*, 46(1), pp. 149–157, doi:10.1016/j.dss.2008.06.003.

Cohen, J., Cohen, P., West, S. G., and Aiken, L. S. (2013). *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*. Mahwah–London: Routledge.

Corkindale, D., and Ram, J. (2014). "How 'Critical' Are the Critical Success Factors (CSFs)? Examining the role of CSFs for ERP." *Business Process Management Journal*, 20(1), pp. 151–174, doi:10.1108/BPMJ-11-2012-0127.

Crawford, S. L. (2006). "Statistical Primer for Cardiovascular Research Correlation and Regression Circulation." *Circulation*, 114, pp. 2083–2088.

Eseryel, U. Y. (2019). "The Case of 'Med-Global': IT-Enables Innovation and Implementation by non-IT Business Unit Leaders." *Strategy & Leadership*, 47(2), pp. 43–48, doi:https://doi.org/10.1108/SL-01-2019-0013.

European Commission. (2016). *User Guide to the SME Definition*. Retrieved from: https://op.europa.eu/en/publication-detail/-/publication/79c0ce87-f4dc-11e6-8a35-01aa75ed71a1.

Field, A. (2013). *Discovering Statistics using IBM SPSS Statistics*. Sage Publications Ltd.

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, doi:10.1108/14637150710752272.

Gable, G. G. (1994). "Integrating Case Study and Survey Research Methods: An Example in Information Systems." *European Journal of Information Systems*, 3(2), pp. 112–126, doi:10.1057/ejis.1994.12.

Gattiker, T. F., and Goodhue, D. L. (2005). "What Happens After ERP Implementation: Understanding the Impact of Interdependence and Differentiation on Plant-Level Outcomes." *MIS Quarterly*, 29(3), pp. 559–585, doi:10.2307/25148695.

Gelo, O., Braakmann, D., and Benetka, G. (2008). "Quantitative and Qualitative Research: Beyond the Debate." *Integrative Psychological and Behavioral Science*, 42(3), pp. 266–290.

Grewal, R., Cote, J. A., and Baumgartner, H. (2004). "Multicollinearity and Measurement Error in Structural Equation Models: Implications for Theory Testing." *Marketing Science*, 23(4), pp. 519–529.

Haddara, M. (2018). "ERP Systems Selection in Multinational Enterprises: A Practical Guide." *International Journal of Information Systems and Project Management*, 6(1), pp. 43–57.

Hong, K.-K., and Kim, Y.-G. (2002). "The Critical Success Factors for ERP Implementation: An Organizational Fit Perspective." *Information & Management*, 40(1), pp. 25–40, doi:https://doi.org/10.1016/S0378-7206(01)00134-3.

Huber, G. P., and Power, D. J. (1985). "Retrospective Reports of Strategic-Level Managers: Guidelines for Increasing Their Accuracy." *Strategic Management Journal*, 6(2), pp. 171–180.

Hustad, E., Haddara, M., and Kalvenes, B. (2016). "ERP and Organizational Misfits: An ERP Customization Journey." *Procedia Computer Science*, 100, pp. 429–439, doi:https://doi.org/10.1016/j.procs.2016.09.179.

Ifinedo, P., Udo, G., and Ifinedo, A. (2010). "Organisational Culture and IT Resources Impacts on ERP System Success: An Empirical Investigation." *International Journal of Business and Systems Research*, 4(2), pp. 131–148, doi:10.1504/IJBSR.2010.030771.

Jose, G., and Mampilly, S. R. (2015). "Relationships Among Perceived Supervisor Support, Psychological Empowerment and Employee Engagement in Indian Workplaces." *Journal of Workplace Behavioral Health*, 30(3), pp. 231–250, doi:10.1080/15555240.2015.1047498.

Kamhawi, E. M. (2007). "Critical Factors for Implementation Success of ERP Systems: An Empirical Investigation from Bahrain." *International Journal of Enterprise Information Systems*, 3(2), pp. 34–49.

Klein, K. J., and Sorra, J. S. (1996). "The Challenge of Innovation Implementation." *Academy of Management Review*, 21(4), pp. 1055–1080.

Levin, R., Mateyaschuk, J., and Stein, T. (1998). "Faster ERP Rollouts." *Information Week*, 691(24).

Lewin, K. (1951). *Field Theory in Social Science*, in: D. Cartwright, (ed.). (1951). *Selected Theoretical Papers*. New York: Harper & Row.

Markus, M. L., Axline, S., Petrie, D., and Tanis, S. C. (2000). "Learning from Adopters' Experiences with ERP: Problems Encountered and Success Achieved." *Journal of Information Technology*, 15(4), pp. 245–265, doi:10.1080/02683960010008944.

May, C., and Finch, T. (2009). "Implementing, Embedding and Integrating Practices: An Outline of Normalization Process." *Sociology*, 43(535).

Michie, S., van Stralen, M. M., and West, R. (2011). "The Behavior Change Wheel: A New Method for Characterising and Designing Behavior Change Intervensions." *Implementation Science*, 6(42).

Miller, T. (2018). "Cloud ERP vs On-Premise ERP: An Objective Comparison." *Cloud ERP*. Retrieved from: https://www.erpfocus.com/cloud-erp-vs-on-premise-erp.html.

Mui, H. K. Y., Basit, A., and Hassan, Z. (2018). "The Impact of Strategic Leadership on Organizational Performance of Small Medium Enterprises (SME) in Malaysia." *Journal of Leadership and Management*, 13, pp. 154–166.

Natrella, M. (2010). *NIST/SEMATECH e-Handbook of Statistical Methods: NIST/SEMATECH*. Retrieved from: https://www.itl.nist.gov/div898/handbook/.

Nilsen, P. (2015). "Making Sense of Implementation Theories, Models and Frameworks." *Implementation Science*, 10(53), doi:10.1186/s13012-015-0242-0.

Panorama Consulting Solution's 2017 ERP Report. Retrieved from: https://www.panorama-consulting.com/wp-content/uploads/2017/07/2017-ERP-Report.pdf.

Parr, A. N., and Shanks, G. (2000, 7-7 Jan. 2000). *A Taxonomy of ERP Implementation Approaches*. Paper presented at the Proceedings of the 33rd Annual Hawaii International Conference on System Sciences.

Premkumar, G., and Roberts, M. (1999). "Adoption of New Information Technologies in Rural Small Businesses." *Omega*, 27(4), pp. 467–484, doi:https://doi.org/10.1016/S0305-0483(98)00071-1.

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, doi:10.1080/07421222.2002.11045713.

Rochart, J. F. (1979). "Chief Executives Define Their Own Data Needs." *Harvard Business Review*, 57(2), pp. 81–93.

Ross, J. W., Weill, P., and Robertson, D. (2006). *Enterprise Architecture as Strategy*. Boston: Harvard Business School Press.

Schlichter, B. R., and Kraemmergaard, P. (2010). "A Comprehensive Literature Review of the ERP Research field Over a Decade." *Journal of Enterprise Information Managment*, 23(4), pp. 486–520.

Schmiemann, M. (2008). "Enterprises by Size Class-Overview of EMSs in the EU." *Statistics in Focus*, 31.

Schneider, B. (1990). *The Climate for Service: An Application of the Climate Construct*, in: B. Schneider, (ed.). (1990). *Organizational Climate and Culture*. San Francisco: Jossey-Bass, pp. 383–412.

Sia, S., and Soh, C. (2007). "An Assessment of Package-Organisation Misalignment: Institutional and Ontological Structures." *European Journal of Information Systems*, 16(5), pp. 568–583.

Soh, C., and Sia, S. (2005). "The Challenges of Implementing 'Vanilla' Versions of Enterprise Systems." *MIS Quarterly Executive*, 4(3).

Soja, P. (2006). "Success Factors in ERP Systems Implementations: Lessons from Practice." *Journal of Enterprise Information Management*, 19(4), pp. 418–433, doi:10.1108/17410390610678331.

Somers, T. M., and Nelson, K. (2001, 6-6 Jan. 2001). *The Impact of Critical Success Factors Across the Stages of Enterprise Resource Planning Implementations*. Paper presented at the Proceedings of the 34th Annual Hawaii International Conference on System Sciences.

Statista. (2017). *Percentage of Enterprise Resource Planning (ERP) Implementation Projects Overrunning Duration from 2010 to 2017*. Retrieved from: https://www.statista.com/statistics/526441/worldwide-erp-implementation-projects-duration-overrun/.

Thomas, K. W., and Velthouse, B. A. (1990). "Cognitive Elements of Empowerment: An 'Interpretive' Model of Intrinsic Task Motivation." *The Academy of Management Review*, 15(4), pp. 666–681, doi:10.2307/258687.

van Aken, J. E., Berends, H., and van der Bij, H. (2007). *Problem-Solving in Organizations: A Methodological Handbook for Business Students*. Cambridge: Cambridge University Press.

Venkatraman, S., and Fahd, K. (2016). "Challenges and Success Factors of ERP Systems in Australian SMEs." *Systems*, 4(20), 18, doi:10.3390/systems4020020.

Weiner, B. J. (2009). A Theory of Organizational Readiness for Change." *Implementation Science*, 4(67).

Zahra, A. S., and George, G. (2002). "Absorptive Capacity: A Review, Reconceptualization and Extension." *Academy of Management Review*, 27(1), pp. 185–203.