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A Study of Critical Success Factors for Enterprise Systems Implementation by SMEs

Completed Research Paper

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Abstract

Due to the unique characteristics of small-and-medium sized enterprises (SMEs), critical success factors (CSFs) identified in the context of large enterprises may not be readily applicable to SMEs. This paper aims to enhance the current understanding of CSFs for ES implementation in SMEs. It synthesizes a set of CSFs that are likely to be significant for ES implementation in SMEs and then explores the perception of 30 SMEs regarding influential CSFs through an analysis of online customer success stories. The study highlights some differences in CSF identified in the literature and those perceived by SMEs. By identifying CSFs of high importance within the context of SMEs this study improves the prospects of successful ES implementation. It also identifies knowledge gaps that could be addressed in future studies to enhance the current understanding of CSFs for ES implementations in SMEs.

Keywords: Small-and-medium enterprises (SME), enterprise systems, critical success factors, ERP implementation

Introduction

Enterprise Systems (ES) are large-scale, real-time, integrated, packaged software applications that support information flows, business processes, reporting and business analytics within or between organizations (Seddon et al. 2010). Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Supply Chain Management (SCM) and Business Analytics/Intelligence (BA/BI) are examples of typical ES. ES are designed to replace various isolated systems in large enterprises. Their purpose is to capture, process and store data to collectively achieve business goals in an efficient manner and to overcome the silo effect (Davenport 1998). Traditionally, ES have been exclusively implemented by large enterprises due to their complex business processes.

The convolution, high failure rate and cost associated with ES implementation are the most important reasons inhibiting their diffusion among small and medium-sized enterprises (SMEs) (Ahmad and Cuenca 2013). The criteria for distinguishing SMEs from large enterprises vary across regions and

countries. In Europe, SMEs are defined as firms with less than 250 employees and an annual turnover of below €50 million (about USD 60 million) (Walsh et al. 2010). In Australia, SMEs have under 200 employees and annual turnover of less than $2 million (Australian Bureau of Statistics 2002). The US and Canada set a threshold of fewer than 500 employees to be considered as an SME (Snider et al. 2009). Xia et al. (2009) report that Chinese SMEs have less than 2000 employees and their annual turnover are less than ¥400 million (about USD 62 million). Reflecting on the various definitions of SMEs, in this study, we define SMEs as organizations with less than 500 employees that generate less than USD 60 million turnovers.

With the saturation of the market for large enterprises, ES providers have shifted their focus to SMEs to grow their sales revenue (Federici 2009). In particular, with recent technological advancement and increasing rivalry among ES vendors, ES price has been decreasing significantly (Xia et al. 2009). In addition, the benefits demonstrated by successful ES adopters continuously encourage and attract organizations that have not implemented ES. Therefore, an increasing number of ERP vendors start shifting their focus onto SMEs (Ahmad and Cuenca 2013). Two major ES providers, namely SAP and Oracle, have developed SME specific products with the perception that increasing the revenue from large enterprise market is increasingly hard (Sledgianowski et al. 2008). As a result, ES implementation rate among SMEs is reported to have accelerated as they expect to gain or maintain competitive advantage from ES (Cereola et al. 2012). However, the consequences of ES implementation failure in SMEs are potentially more catastrophic than those in large companies, since SMEs have fewer resources and perform with lower profitability (Ruivo et al. 2014). Thus, understanding how to enhance the propensity of ES implementation success among SMEs is important for information systems research and practice.

The literature on ES implementation has been dominated by studies within the context of large enterprises. However, knowledge and lessons learned through such studies may not be readily applicable to SMEs because SMEs are fundamentally different from large companies in many ways including technologies being employed, business complexity, operational styles and market competitiveness. In particular, there is a limited understanding of how critical success factors (CSFs) for SMEs are different from those for large enterprises and why they are different. Although research literature is rich with studies of CSFs, many of them simply transfer the CSF findings from the large organizations' context into the SMEs' context (e.g. Buonanno et al. 2005; Upadhyay and Dan 2009), or conduct SME-related studies with narrow focus, thus limiting generalizability of findings. A few studies consider selected CSFs in their investigation (Ahmad and Cuenca 2013; Doom et al. 2010; Hong and Kim 2002; Reuther and Chattopadhyay 2004; Sun et al. 2005), while others focus on a particular industry, usually within a geographical location (Almajali et al. 2016; Poba-Nzaou et al. 2008; Yeh et al. 2007). Some researchers focus on a single case study within a single geographical location. For examples, (Poba-Nzaou et al. 2008) investigate one SME in Canada, (Lee et al. 2008) assess one SME in Korea, (Christofi et al. 2013) consider one SME in Cyprus. In addition, others examine multiple case studies in one geographical location only such as India (Ganesh and Mehta 2010; Saini et al. 2013; Upadhyay and Dan 2009), Belgium (Doom et al. 2010), China (Xia et al. 2009), Taiwan (Chen et al. 2008; Wu and Wang 2003), and Bahrain (Kamhawi 2008). Thus, although researchers have recognised the need for investigating CSFs for ES implementation by SMEs, there is still a significant gap in the current research literature which calls for further investigation of CSFs affecting success of ES implementation in SMEs.

To enhance the current understanding of factors guiding ES implementation success within the SME context, this study addresses the following research question:

What knowledge gaps exist between the current understanding based on the existing literature and the actual perception of SMEs regarding CSFs for ES implementation?

To answer the research question, we first review and synthesize CSFs affecting ES implementation identified in the previous studies. Then the perceptions of 30 SMEs regarding CSFs are explored by analyzing success stories obtained from the websites of 10 different major ES vendors specializing in the SME market with a global coverage. The inconsistencies between the findings obtained from the literature analysis and the success stories identified in this study indicate that the current understanding

of CSFs within the SME context is still inadequate. This study highlights the knowledge gaps in this area and identifies future research directions.

The next section provides a brief description of the research methodology. Then we present the result of our literature analyis and synthesis on CSFs for ES implementations by SMEs, followed by the analysis of 30 customer success factors to identify CSFs that are perceived to be important by those SME customers of the selected 10 vendors. We then compare our literature synthesis with the analysis of customer success factors and discuss our observations. Finally, we conclude the paper by outlining study contributions, limitations and possible future research to complement the findings of our study.

Research Methodology

In this study, we first conducted an interpretive literature review to synthesize CSFs that affect ES implementations in SMEs (Schultze 2015). The keywords used to search for relevant articles included Enterprise Resource Planning, Enterprise Systems, ES/ERP implementation, Small and Medium Enterprise, Critical Success Factors, and their combinations. Based on the articles identified, we synthesized key characteristics of SMEs to clearly identify the differences between SMEs and large enterprises and CSFs for ES implementation in SMEs. We further refined our synthesis on CSF by identifying CSFs that are *distinct* for SMEs because they are never discussed in the mainstream ES literature focusing on large organizations and those SME CSFs that are *frequently cited* and discussed in the literature. We use the TOE framework (Tornatzky and Fleischer 1990) to categorize these CSFs into Technology, Organizational and Environment categories.

After identifying a list of distinct CSFs and frequently cited CSFs for ES implementation by SMEs, we then analyzed 30 customer success stories identified from 10 selected online vendor sites. ES providers were selected based on their ranking in Web search engines, such as Google and Bing, and their focus on SME customers. To keep the size manageable, for this paper we chose only three customers from each vendor whose stories are deemed to be the most comprehensive and clear and thus can represent the majority of other customers' views on the vendor, the product and the implementation process. Content analysis was used to analyze these 30 success stories which contain qualitative and unstructured data (Seuring and Gold 2012). Four major steps of content analysis including material collection, descriptive analysis, category selection and material evaluation (Mayring 2010; Seuring and Gold 2012) were applied in this study to ensure the process is systematic, unbiased and transparent. Finally, we compare our analysis of these success stories with our literature synthesis to identify the difference between the perception of SMEs and what the literature has identified regarding CSFs affecting ES implementation in SMEs.

Synthesis of CSFs for ES Implementation within SMEs

SMEs have a number of characteristics that make them fundamentally different from large enterprises affecting their ability to implement ES. From a technological perspective, for example, our literature synthesis indicates that SMEs is less open to technologies and lack of modern IT infrastructure (Ali and Cullinane 2014; Buonanno et al. 2005; Huin 2004). From an organizational perspective, SMEs typically have limited financial, human and skilled resources to implement ES which are complex and expensive (Dixit and Prakash 2011). They also have less established processes, structure and strategy to deal with strategic decisions and focus on specific market niches that require specific capabilities (Buonanno et al. 2005; Moljevic et al. 2013). The top management are usually less experienced but extremely influential since they could the owner of the organizations and resistance to change is cultivated in the SME work and organizational culture (Cereola et al. 2012; Snider et al. 2009). Furthermore, from an environmental perspective, SMEs are more vulnerable to external factors including market change and external influences and their position in the market are weak (Bierly and Daly 2007; Dixit and Prakash 2011). Therefore, factors affecting the success of SMEs in implementing ES are expected to be different from those of large enterprises.

The concept of important factors that influence the success of a business was first introduced by Daniel (1961) and later advanced in the field of management information systems by Rockart (Bullen and Rockart 1981; Rockart 1979) who refined this concept into CSFs. Since then researchers have

extensively used CSFs in analysis of the ES implementation phase in order to understand what leads to success or failure of the complex projects (Saxena and McDonagh 2017).

Building upon the previous studies on CSFs within the large enterprises (LEs) and SME contexts, this study proposes six sub-categories of CSFs within the Technical, Organizational and Environmental (TOE) framework: IT, Change Management (CM), Functional Fit (FF), Project Management (PM), Top Management Support (TM) and External Factors. Current literature provides different views on granularity of CSFs. There are factors that are closely related and should not be examined in isolation (for example, top management support, project champion, and empowered decision makers; software localization and software configuration). At the same time for an SME taking too many factors into account adds complexity to the project (Saxena and McDonagh 2017). Therefore our goal was to work with mangeable number of most frequently cited CSFs. Our synthesis of the existing literature yields several distinct CSFs for SME which are factors that are identified only in studies within the SME context. Distinct CSFs are relatively novel and have not been widely discussed. Our synthesis also reveals several frequently cited CSFs that refer to factors that have been cited by at least 50% of the SME related articles reviewed. Table 1 summarizes distinct and frequently cited CSFs for ES implementation within the SME context. Based on the TOE framework, none of CSFs is related to technology, while most CSFs are related to organization. The relevance of these factors is further assessed through the use of 30 customer success stories in the next section.

Table 1. Distinct and frequently cited CSFs for ES implementation within the SME context

TOE Type	CSFs Category	CSFs	Distinct to SMEs	Frequently cited
Org	CM	Communication		Yes
		Training and Education		Yes
	FF	Balanced Team		Yes
		Software Localization	Yes	
		Software Modification	Yes	
	PM	Project Management Approach		Yes
		Team Competence		Yes
	TM	Top Management Support		Yes
Env	EXT	ES Affordability	Yes	
		Consultant Support/Relationship		Yes
		Vendor Support/Relationship		Yes

Distinct CSFs for SMEs

Our literature synthesis identifies three distinct CSFs affecting the success of ES implementations in SMEs which are discussed below.

Software Localization is the first factor identified in the SME ES implementation that is never discussed in the mainstream ES literature focusing on large organizations. It refers to adjustments to ES software package that makes the product relevant to local contexts (Liang and Xue 2004). Liang and Xue (2004) further argue that generic best practices are generally not effective for SMEs. The region, country, regulations, culture and context in which ES are implemented should determine how an ES package should be provided. Software localisation is hence important for SMEs not only because SMEs usually compete in regional and local niche markets that have specific contextual requirements and regulations, but also because it is a relatively cost-effective option. In comparison with software modification, software localization does not include fundamental source code changes. Rather, it involves changes in settings (such as language of the user interface), and parameters reflecting local regulations and compliance requirements for taxation, accounting and government policies.

Software Modification is the second distinct factor identified, which refers to the required level to change ES package source code to fulfil specific organizational needs (Brehm et al. 2001). Most of the existing ES studies in the context of LE agree that package code modification leads to massive efforts required for maintenance and upgrades. Therefore, a vanilla implementation is recommended (Brehm et al. 2001; Buonanno et al. 2005; Dixit and Prakash 2011; Marsh 2000; Rothenberger and Srite 2009; Sledgianowski et al. 2008). However, SMEs usually gain competitive advantage through their unique processes and hence modification to ES package is a necessity (Huin 2004; Marsh 2000).

ES Affordability is another SME distinct factor that refers to the level of resource requirements to implement an ES package. This factor includes financial cost and human resources required for ES implementation, as well as maintenance and future upgrade. In the SMEs context, the importance of this factor is significant because SMEs usually have fewer resources (Upadhyay and Dan 2009).

Frequently cited CSFs

Our synthesis indicates that there are eight CSFs frequently cited in the existing literature related to ES implementation in SMEs which are discussed below.

Communication and **Training & Education** are two factors related to Change Management (CM) category which have been well discussed in both SME related ES literature and the mainstream ES literature involving large organizations. Umble et al. (2003) contend that ES fundamentally change the way in which an organization operates. To reduce possible resistance and maximize the benefits of ES implementation, an effective change management strategy must be established to prepare employees to accept the changes in the business processes and to use the system effectively. Although organizations can get assistance from external parties, change management related activities must be led by the adopting organization because its purpose is to address the company-wide management and other internal barriers (De Wit and Meyer 2010). Effective communication within the organization to explain the benefits of a new packaged software and the required changes in work procedures need to be maintained as part of the change management program (Ruivo et al. 2014). Likewise, employees need to be well trained and educated so they can use the new system effectively to help them do their job efficiently (Ruivo et al. 2013; Walsh et al. 2010). Therefore, an SME that wants to implement ES needs to address change management and utilize external resources effectively to ensure smooth implementation.

A **Balanced Team** is considered crucial for achieving ES functional fit (FF) and hence it is one of the important CSFs for both SMEs and LEs. Ganesh and Mehta (2010) assert that a balanced team should consist of personnel from various business functions and external consultants with technical and relevant knowledge. However, a balanced team is particularly harder to establish in SMEs than in large enterprises because SMEs have a smaller base of human resources with less experience (Doom et al. 2010). This could be the reason that this factor is more frequently highlighted than others in the FF category including software selection and business process reengineering.

Project Management Approach and **Team Competence** are two other frequently cited factors within the Project Management (PM) category identified in our literature review. Project Management Approach refers to how the ES project is managed including management of scope, schedule, cost, quality, and risk (PMI 2004). It is significant for SMEs because the expertise required for effective project management approach is not often available internally. Furthermore, Team Competence is found to be a critical success factor since lack of experience and knowledge of ES implementation within SMEs is also one of the common barriers to ES project success in SMEs. Other CSFs within the PM category, such as Data Accuracy and System Testing are not emphasized much in the literature since SMEs usually rely on external parties.

Top Management Support is also one of CSFs frequently acknowledged in the literature for both SMEs and LEs (e.g. Dezdar and Ainin 2011; Finney and Corbett 2007). In the context of SME, top management has extraordinary influence and power on business planning, visioning and goal setting. Therefore, once top management decides to embark on an ES project, it is important that they maintain their commitment and involvement throughout the project.

Consultant Support/Relationship and **Vendor Support/Relationship** are two frequently acknowledged CSFs in the previous studies related to SMEs and LEs (Schniederjans and Yadav 2013; Zach and Munkvold 2012)**.** The lack of human resources, experience and expertise to effectively execute ES projects necessitates SMEs to seek support from external parties. Therefore, consultant and vendor support as well as their willingness to collaborate with SMEs are considered crucial for successful ES implementation in SMEs (Liang and Xue 2004; Upadhyay and Dan 2009).

There are CSFs that have been identified as important in studies related to large enterprises but less frequently cited in SME specific studies. We did not include such CSFs in our discussion. For example, user involvement is commonly identified as an important factor particularly in relation to change management. However, Saxena and McDonagh (2017) in their analysis of CSFs point out that user involvement could be counterproductive due to their lack of understanding of the new system and their views being grounded in their "old" business practices. Therefore, in the context of SMEs, user involvement arguably does not seem to have a major influence in ES implementation success. Business process re-engineering (BPR) is also not often emphasized in the SME related literature because SMEs tend to maintain their unique business processes (Liang and Xue 2004).

Analysis of Customer Success Stories

To triangulate our assessment of the CSFs list derived from our literature synthesis, we selected and reviewed 30 customer success stories obtained from ten ES vendor websites. These vendors are leading ES vendors operating across the globe. The number of countries in which these vendors operate ranges from 5 to 65. Although we analyzed almost all customer success stories from each vendor, in this paper we only include three most comprehensive and representative customer stories from each vendor. The 30 customers are arguably representative of the target population because they involve 10 major ES vendors, come from different industry sectors ranging from manufacturing, to wholesale, to services to mining and are located in different geographical regions as shown in Table 2 (note N/A indicates that geographical location of the customer was not available).

Table 2. List of vendors and customers assessed

ES Vendors	Established Year	Customers	Customers' Industry	Geo Location
AB	1980	AB6, AB38, AB66	Manufacturing	Europe, Germany, Germany
AP	1984	AP7, AP13, AP14	Manufacturing	N/A
BL	1992	BL2, BL5, BL14	Manufacturing, wholesale	USA, South Africa, Canada
CO	1983	CO2, CO4, CO7	Manufacturing, wholesale	USA, USA, USA
EP	1981	EP5, EP9, EP13	Manufacturing, service	UAE, Saudi Arabia, Egypt
IN	2002	IN63, IN67, IN85	Manufacturing, mining, service	Italy, USA, The Netherlands
IQ	1989	IQ2, IQ6, IQ8	Manufacturing	USA, USA, USA
OC	1969	OC1, OC2, OC3	Manufacturing, service	USA, USA, USA
OD	2005	OD1, OD2, OD4	Manufacturing, service	France, Belgium, USA
SP	1980	SP1, SP2, SP3	Manufacturing	USA, UAE, UAE

To identify the most significant CSFs that are cited in customer success stories, Pareto analysis (the 80-20 rule) is employed. Table 3 shows the top 8 CSFs representing 21% of the total CSFs collectively contributing to 83% of the cases. Each of these CSFs is briefly discussed below. Again, none of the CSFs identified is related to technology.

First, the importance of **Vendor Support/Relationship** is supported by evidence from 18 success stories analyzed. For example, the Representative of Customer OC1 claims: "*Since switching to OC, we have come to realize the true value of vendor commitment. Most vendors are there for you at the start, but they soon fade away. The ES vendor has always been there for us. We now view it as a partner rather than simply a vendor.*" Our analysis also identified that **Software Configuration/Customization** is important for SMEs to gain/maintain their competitive advantage by doing business in their non-conventional ways. The CFO of Customer EP5 reports: "[The ES] *has allowed us to fully customize our*

reports and has adapted to match how our business operates. I have extensive experience with several other ERP software systems and have never had the ability to create reports and make adjustments like [this one]." Furthermore, **Software Selection** appears to be an important CSF among SMEs assessed, although this is not the case for large enterprises. For example, Customer OC1 considered performance, the total cost of ownership, system flexibility, customization requirement, support and underlying technologies when selecting their ideal ES.

Table 3. Pareto Analysis for CSFs Found in Customer Success Stories

TOE Type	CSF Category	CSF	CSF Type	Number of cases	% of total number of cases	Accumulative %
Env	EXT	Vendor Support/Relationship	Frequently cited	18	16%	16%
Org	FF	Software Configuration and		15	13%	29%
Org	FF	Software Selection		14	12%	41%
Org	TM	Business Plan, Vision, Goals		13	11%	53%
Org	FF	Business Alignment		13	11%	64%
Org	CM	Training and Education	Frequently cited	8	7%	71%
Org	FF	Software Modification	Distinct	7	6%	77%
Env	EXT	ES Affordability	Distinct	7	6%	83%

There are 13 cases that acknowledge the significance of **Business Plan, Vision, and Goals** in implementing ES by SMEs. For example, the VP of Finance and Controller at Customer IN63 explains that it was important for the ES implemented to support their business goals: "*We were searching for a solution that was flexible so we could make reporting adjustments, and that would give us more visibility into transactions supporting our financial statements*." Furthermore, **Business Alignment** which is related to how well an ES is aligned with an organization's business needs is identified as an influential factor in 13 cases. The more alignment, the more likelihood the ES project is going to succeed. Customer OC1 believes that their ES is well aligned with their business needs: "*It offered critical capabilities that enabled us to implement a just-in-time production and distribution strategy that keeps us very competitive*".

Software Modification has also been identified as an influential CSF in the customer success stories analyzed. Customer OC2 emphasizes the importance for the vendor to be willing and able to modify the software based on their company's specific needs without introducing significant additional costs: "*We did need a few modifications and vendor quickly created them for us. Unlike many other software vendors, those modifications did not become costly add-ons. It makes me feel good that they listen and continually improve the product to serve our changing needs*". Likewise, 8 cases identified the importance of **Training and Education.** For example, the Logistics and Automation Manager at Customer IN85 testified on the benefit of the training of the new ES in his comment: "*During the implementation of it, the main users were first trained and received an explanation of what was now possible*".

Finally, **ES Affordability** is also one of the important CSFs identified. For example, customer CO2 reports the following: "*It is an economical, cost effective solution to larger ERP systems. The ROI on the solution compared to a larger ERP ... is significantly faster*." Furthermore, the owner at OC2 explains the significance of cost consideration for their company: "*Cost was also a major factor. I could not afford the kind of money that a General Motors or a large tier one supplier can throw at the problem…The cost-benefit ratio really gives us a tremendous advantage*."

Discussion

This study aims to identify the knowledge gaps between the current understanding of what CSFs affect ES implementation in SMEs based on the existing literature and the actual perception of SMEs. Table 4 consolidates the distinct and frequently cited CSFs from the literature and influential CSFs identified

in customer success stories. The synthesis highlights the differences between what is reported in the literature and the perception of SMEs involved in the customer success stories. Overall, only two distinct and three frequently cited CSFs are supported by customer success stories, the other eight are not. Below we discuss our key observations.

Distinct CSFs

The importance of **Software Modification** and **ES Affordability** is supported by the empirical evidence obtained from the customer success stories. Our finding confirms the findings of the limited studies of ES implementation within the SME context (Ganesh and Mehta 2010; Liang and Xue 2004). **Software Modification** contradicts the vanilla implementation approach that has been encouraged in the general ES/ERP implementation literature which is dominated by studies in large enterprises (Dixit and Prakash 2011; Finney and Corbett 2007; Marsh 2000). Therefore, this factor is only observed in previous studies involving SMEs. **ES Affordability** has never been a concern for large enterprises but our study shows that this factor is important for SMEs with limited financial resources (Blackwell et al. 2006). These two CSFs should be given sufficient attention by the senior management of SMEs when considering implementing an ES.

Table 4. Summary of the overall observations based on customer success stories

TOE Type	CSFs Category	CSFs	Distinct	Frequently cited	Influential in customer success stories (Number of cases)
Org	CM	Communication		Yes	
		Training and Education		Yes	Yes (8)
	FF	Balanced Team		Yes	
		Business Alignment			Yes (13)
		Software Configuration and Customization			Yes (15)
		Software Localization	Yes		
		Software Modification	Yes		Yes (7)
		Software Selection			Yes (13)
	PM	Project Management Approach		Yes	
		Team Competence		Yes	
	TM	Top Management Support		Yes	
		Business Plan, Vision, Goals			Yes (14)
Env	EXT	*ES Affordability*	Yes		Yes (7)
		Consultant Support/Relationship		Yes (4)	
		Vendor Support/Relationship		Yes (4)	Yes (18)

The importance of **Software Localization,** however, is not supported by the customer success stories. Since this factor is vendors' pro-active effort in adapting the software to suit the region, country, culture or regulation, SMEs may not be aware of it and may take it for granted. Therefore, although it is recognized as a distinct CSF for SMEs in Liang and Xue (2004), their finding is not supported by any of the customer success stories examined in this study. Further studies are required to explore the importance of this factor for successful ES implementation by SMEs to complement the findings of Liang and Xue (2004) which are limited to a specific geographical location (China).

Frequently cited CSFs

Training and Education, **Business Plan, Vision, Goals**, and **Vendor Support/Relationship** are three frequently cited CSFs that are supported by the customer success stories. Thus, our finding confirms

the findings of previous studies (e.g. Ganesh and Mehta 2010; Noudoostbeni et al. 2009; Snider et al. 2009; Upadhyay and Dan 2009) that these CSFs are important for the context of SMEs.

However, six frequently cited CSFs in the literature are not supported by our empirical data. Among them, only one factor **(Consultant Support/Relationship)** is related to the Environment aspect of the TOE framework, while the other five belong to the Organization aspect. In most of the success stories, SMEs deal directly with their ES vendors without involving consultants since consultants are expensive and unnecessary for SMEs. CSFs related to organizational aspect are mostly related to project management and achieving functional fit. However, SMEs rely more on the vendor to adress their needs and seem to be less concerned with factors such as **Balanced Team, Project Management Approach**, and **Team Competence**. SMEs rarely have the necessary human resources and experience for managing a project (Ahmad and Cuenca 2013; Snider et al. 2009). In the majority of the customer success stories, ES vendors look after the project management activities. This could explain why these CSF are not recognized as important.

Interestingly, **Top Management Support** is not recognized as an influential CSF in the customer success stories examiend. This could be explained by the fact that ES projects in SMEs are initiated by their top management that is often the business owner (Laukkanen et al. 2005; Snider et al. 2009). Therefore, in the context of SMEs, top management support is taken for granted and requires less attention compared to large enterprises. Finally, **Communication** is also found not be influential. A possible reason could lie in the fact that SMEs are small in size and simple in structure and therefore it would not be a challenge to communicate to the entire organization about the project and its benefits (Ahmad and Cuenca 2013).

Influential CSFs that are NOT well recognized in previous SME studies

We have also identified four CSFs from the customer success stories which have not been well recognized in previous studies focusing on CSFs for SME ES implementation. First, **Software Configuration/Customization** is the second most often cited CSFs identified in the customer success stories that seems not be well recognized in the existing literature (e.g. Doom et al. 2010; Upadhyay and Dan 2009; Xia et al. 2009). This factor is perhaps critical considering that an SME typically has specialized capabilities with specific business needs (Huin 2004; Liang and Xue 2004; Marsh 2000). In addition, the importance of **Software Selection** is well identified in several customer success stories. As SMEs are often competing in a niche market (Huin 2004), a generic ES package that can be found relatively easily in the market is less favored than a specialized package. Therefore, selecting an ES package that fits the nature of an SMEs' business is critical to the success of the project.

The influence of the above CSFs in ES implementation by SMEs also explains the importance of **Business Alignment** as observed in our empirical data. This factor is necessary to ensure the selected ES can address specific business needs of a particular SME. For example, the President of OD4 states: "*The existing ES struggled to support our business operation, the open architecture is what we value most, ... we have the ability to design, develop, and deploy a software system that exactly matches our intended company's operations*." However, only one recent study by Doom et al. (2010) acknowledges the significance of Business Alignment as a CSF for ES implementation in SMEs. Further studies to investigate why this factor has not been well recognized in previous studies will complement the current understanding of SME specific CSFs for ES implementation.

Conclusion and Future Study

The importance of Enterprise Systems to integrate various business processes within organizations has been widely recognized not only among large enterprises but also among SMEs. However, SMEs have different characteristics compared to large enterprises. As a result, the CSFs of ES implementation in SMEs are expected to be different from those for large enterprises. Currently, the literature of the ES implementation success has been dominated by studies conducted within large enterprises. Through this study, we have enhanced the current understanding of the CSFs that are important for SMEs to manage in ES implementation. We have also highlighted the gaps between the current understanding reported

in the literature and the actual perception of SMEs regarding which CSFs are particularly important for the success of ES implementation in SMEs.

In terms of contribution to research, our study identifies both unique and frequently cited CSFs for ES implementation by SMEs. The current body of knowledge has identified a long list of CSFs making it impractical and confusing for SMEs. In addition, CSFs specific to SMEs have not been discussed in previous studies but have important implications to ES implementation success. By narrowing the list of CSFs to the ones that are of most importance for ES implementation by SMEs this study provides potential directions for future research in this increasingly important area. By combining the literature analysis and customer success stories, this study has identified a number of CSFs that need further empirical investigation since there have been inconsistencies between the findings from the previous studies and the actual perception of SMEs. Nevertheless, the fact that most of the CSFs belong to the organizational category is common for both SMEs and LEs.

In terms of practical contributions, the identified CSFs from both the literature analysis and customer success stories help SMEs recognize important factors that affect the success of ES implementation. Such an understanding can help top management, consultants and ES vendors to devise more appropriate implementation strategies to maximize the benefits of ES implementation. An increase in successful cases of ES implementation among SMEs would demonstrate to other SMEs that have been skeptical of needs to have an ES that the benefits actually outweigh the risks if CSFs are carefully managed.

As this study is among the early attempts to consolidate a list of SME CSFs for ES implementation, there are a number of limitations. Firstly, the literature review is not necessarily inclusive and complete since the article search was time bound and only performed against certain databases. Secondly, some important CSFs could have been missed if they were not cited in the papers examined in this study. Furthermore, the selection and the qualitative review of customer success stories are limited by the sample size and depth of the available data. In addition, the analysis of the success stories was mainly performed by one of the authors who is considered an expert in ES implementation domain. Only ten cases were analyzed by two of the co-authors since their assessments were highly consistent. However, it would enhance the reliability of the analysis if we included inter-rater reliability based on the assessment of at least two co-authors. Moreover, failure cases have not been examined in our study. Nevertheless, we believe this study has further enhanced the current understanding of CSFs for ES implementation in SMEs.

Future studies employing in-depth multiple case studies involving a number of SMEs implementing different ES products would be useful to complement the findings of our study. Such in-depth studies would enable measuring ES success in each case, relate each success indicator with relevant CSFs and develop a specific model that could be tested further with quantitative studies. Furthermore, future studies examining failure cases and identifying CSFs which strongly affect the outcome would enrich and strengthen our findings. Finally, future studies employing a large-scale survey with SMEs in various countries would enhance the generalizability of the current understanding of CSFs for ES implementation by SMEs.

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.

Ali, M., and Cullinane, J. 2014. "A Study to Evaluate the Effectiveness of Simulation Based Decision Support System in ERP Implementation in SMEs," *Procedia Technology* (16), pp. 542-552.

Almajali, D. A., Masa'deh, R. e., 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.

Australian Bureau of Statistics. 2002. "Small Business in Australia." Canberra.

Bierly, P. E., and Daly, P. S. 2007. "Alternative Knowledge Strategies, Competitive Environment, and Organizational Performance in Small Manufacturing Firms," *Entrepreneurship Theory and Practice* (31:4), pp. 493-516.

Blackwell, P., Shehab, E. M., and Kay, J. M. 2006. "An Effective Decision-Support Framework for Implementing Enterprise Information Systems within SMEs," *International Journal of Production Research* (44:17), pp. 3533-3552.

Brehm, L., Heinzl, A., and Markus, M. L. 2001. "Tailoring ERP Systems: A Spectrum of Choices and Their Implications," *34th Annual Hawaii International Conference on System Sciences (HICSS 2001)*, Island of Maui, Hawaii.

Bullen, C. V., and Rockart, J. F. 1981. "A Primer on Critical Success Factors," Massachusetts Institute of Technology.

Buonanno, G., Faverio, P., Pigni, F., Ravarini, A., Sciuto, D., and Tagliavini, M. 2005. "Factors Affecting ERP System Adoption: A Comparative Analysis between SMEs and Large Companies " *Journal of Enterprise Information Management* (18:4), pp. 384-426.

Cereola, S. J., Wier, B., and Norman, C. S. 2012. "Impact of Top Management Team on Firm Performance in Small and Medium-Sized Enterprises Adopting Commercial Open-Source Enterprise Resource Planning," *Behaviour & Information Technology* (31:9), pp. 889-907.

Chen, R.-S., Sun, C. M., Helms, M. M., and Jih, W. J. 2008. "Role Negotiation and Interaction: An Exploratory Case Study of the Impact of Management Consultants on ERP System Implementation in SMEs in Taiwan," *Information Systems Management* (25:2), pp. 159-173.

Christofi, M., Nunes, M., Chao Peng, G., and Lin, A. 2013. "Towards ERP Success in SMEs through Business Process Review Prior to Implementation," *Journal of Systems and Information Technology* (15:4), pp. 304-323.

Daniel, D. R. 1961. "Management Information Crisis," *Harvard Business Review* (39:5), pp. 111-121.

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

De Wit, B., and Meyer, R. 2010. *Strategy: Process, Content, Context: An International Perspective*. Cengage Learning EMEA.

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

Dixit, A. K., and Prakash, O. 2011. "A Study of Issues Affecting ERP Implementation in SMEs," *Researchers World* (2:2), pp. 77-85.

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.

Federici, T. 2009. "Factors Influencing ERP Outcomes in SMEs: A Post-Introduction Assessment," *Journal of Enterprise Information Management* (22:1/2), pp. 81-98.

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.

Ganesh, L., and Mehta, A. 2010. "Critical Success Factors for Successful Enterprise Resource Planning Implementation at Indian SMEs," *International Journal of Business, Management and Social Sciences* (1:1), pp. 65-78.

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.

Huin, S. 2004. "Managing Deployment of ERP Systems in SMEs Using Multi-Agents," *International Journal of Project Management* (22:6), pp. 511-517.

Kamhawi, E. M. 2008. "Enterprise Resource-Planning Systems Adoption in Bahrain: Motives, Benefits, and Barriers," *Journal of Enterprise Information Management* (21:3), pp. 310-334.

Laukkanen, S., Sarpola, S., and Hallikainen, P. 2005. "ERP System Adoption - Does the Size Matter?," in: *38th Annual Hawaii International Conference System Sciences (HICSS'05)*. Big Island, Hawaii: pp. 226-235.

Lee, C. K., Lee, H.-H., and Kang, M. 2008. "Successful Implementation of ERP Systems in Small Businesses: A Case Study in Korea," *Service Business* (2:4), pp. 275-286.

Liang, H., and Xue, Y. 2004. "Coping with ERP-Related Contextual Issues in SMEs: A Vendor's Perspective," *Journal of Strategic Information Systems* (13:4), pp. 399-415.

Marsh, A. 2000. "The Implementation of Enterprise Resource Planning Systems in Small-Medium Manufacturing Enterprises in South-East Queensland: A Case Study Approach," *IEEE International Conference on Management of Innovation and Technology*: IEEE, pp. 592-597.

Mayring, P. 2010. *Qualitative Inhaltsanalyse*. Springer.

Moljevic, S., Rajkovic, D., Maric, B., Medakovic, V., and Durdevic, S. 2013. "Integrated Systems Management in Small and Medium Enterprises," *Annals of the Faculty of Engineering Hunedoara* (11:4), pp. 315-320.

Noudoostbeni, A., Yasin, N. M., and Jenatabadi, H. S. 2009. "To Investigate the Success and Failure Factors of ERP Implementation within Malaysian Small and Medium Enterprises," *International Conference on Information Management & Engineering (ICIME'09)*: IEEE, pp. 157-160.

PMI, A. 2004. "Guide to the Project Management Body of Knowledge (PMBOK), 2004 Edition," *Project Management Institute*.

Poba-Nzaou, P., Raymond, L., and Fabi, B. 2008. "Adoption and Risk of ERP Systems in Manufacturing SMEs: A Positivist Case Study," *Business Process Management Journal* (14:4), pp. 530-550.

Reuther, D., and Chattopadhyay, G. 2004. "Critical Factors for Enterprise Resources Planning System Selection and Implementation Projects within Small to Medium Enterprises," *IEEE International Engineering Management Conference*, pp. 851-855.

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

Rothenberger, M. A., and Srite, M. 2009. "An Investigation of Customization in ERP System Implementations," *Transactions on Engineering Management* (56:4), pp. 663-676.

Ruivo, P., Johansson, B., Oliveira, T., and Neto, M. 2013. "Commercial ERP Systems and User Productivity: A Study across European SMEs " *Procedia Technology* (9), pp. 84-93.

Ruivo, P., Oliveira, T., and Neto, M. 2014. "Examine ERP Post-Implementation Stages of Use and Value: Empirical Evidence from Portuguese SMEs," *International Journal of Accounting Information Systems* (15:2), pp. 166-184.

Saini, S., Nigam, S., and Misra, S. C. 2013. "Identifying Success Factors for Implementation of ERP at Indian SMEs: A Comparative Study with Indian Large Organizations and the Global Trend," *Journal of Modelling in Management* (8:1), pp. 103-122.

Saxena, D., and McDonagh, J. 2017. "Yet Another 'List'of Critical Success 'Factors' for Enterprise Systems: Review of Empirical Evidence and Suggested Research Directions," *UK Academy of Information Systems Conference 2017*.

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

Schultze, U. 2015. "Skirting Slr's Language Trap: Reframing the 'Systematic' Vs 'Traditional' Literature Review Opposition as a Continuum," *Journal of Information Technology* (30:2), pp. 180-184.

Seddon, P. B., Calvert, C., and Yang, S. 2010. "A Multi-Project Model of Key Factors Affecting Organizational Benefits from Enterprise Systems," *Management information systems : mis quarterly* (34:2), pp. 305-328.

Seuring, S., and Gold, S. 2012. "Conducting Content-Analysis Based Literature Reviews in Supply Chain Management," *Supply Chain Management: An International Journal* (17:5), pp. 544-555.

Sledgianowski, D., Tafti, M. H., and Kierstead, J. 2008. "SME ERP System Sourcing Strategies: A Case Study," *Industrial Management & Data Systems* (108:4), pp. 421-436.

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.

Sun, A. Y., Yazdani, A., and Overend, J. D. 2005. "Achievement Assessment for Enterprise Resource Planning (ERP) System Implementations Based on Critical Success Factors (Csfs)," *International Journal of Production Economics* (98:2), pp. 189-203.

Tornatzky, L. G., and Fleischer, M. 1990. *The Processes of Technological Innovation*. MA, USA: Lexington Books.

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.

Upadhyay, P., and Dan, P. K. 2009. "ERP in Indian SMEs: A Post Implementation Study of the Underlying Critical Success Factors," *International Journal of Management Innovation Systems* (1:2), pp. 1-10.

Walsh, G., Schubert, P., and Jones, C. 2010. "Enterprise System Investments for Competitive Advantage: An Empirical Study of Swiss SMEs," *European Management Review* (7:3), pp. 180-189.

Wu, J.-H., and Wang, Y.-M. 2003. "Enterprise Resource Planning Experience in Taiwan: An Empirical Study and Comparative Analysis," *36th Annual Hawaii International Conference on System Sciences (HICSS'03)*, Hawaii: IEEE.

Xia, Y., Lok, P., and Yang, S. 2009. "The ERP Implementation of SME in China," *6th International Conference on Service Systems and Service Management (ICSSSM'09)*, pp. 135-140.

Yeh, T.-M., Yang, C.-C., and Lin, W.-T. 2007. "Service Quality and ERP Implementation: A Conceptual and Empirical Study of Semiconductor-Related Industries in Taiwan," *Computers in Industry* (58:8-9), pp. 844-854.

Zach, O., and Munkvold, B. E. 2012. "Identifying Reasons for ERP System Customization in SMEs: A Multiple Case Study," *Journal of Enterprise Information Management* (25:5), pp. 462-478.