ERP IMPLEMENTATIONS AT SMEs: A CROSS CASE ANALYSIS OF INFLUENTIAL FACTORS

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ABSTRACT

Small and Medium sized Enterprises (SMEs) are increasingly implementing Enterprise Resource Planning (ERP) systems, however the existing implementation guidance in the form of Critical Success Factors (CSFs) is heavily based on experiences at large organizations. Addressing this knowledge gap, multiple case studies were conducted at SMEs who had implemented an ERP system. With cases ranging from successful to unsuccessful, cross-case analysis revealed factors that influenced implementation success, enabling the development of a conceptual framework. Some influential factors are similar to those traditionally associated with large organizations while others are either refined or newly identified.

INTRODUCTION

Enterprise Resource Planning (ERP) systems officially arrived in the early 1990s, though they evolved over the previous few decades when the separate programs of each functional area began to be integrated into one program. Like many other technological advances, ERP systems were initially implemented only at large organizations, and implementation recommendations developed by researchers were correspondingly based on these experiences. The extent of ERP system implementations at Small and Medium sized Enterprises (SMEs) is catching up [6] [9], yet SMEs have been shown to possess significantly different characteristics when compared to large organizations. SMEs typically lack financial resources for consulting fees [8] and have limited human resources to dedicate to projects [11]. Furthermore, SMEs seldom have a dedicated full-time information technology person on staff [1] [9]. With the existing body of knowledge regarding implementation CSFs heavily based on large organizations [2] [3] [5] [14] [17] [18], and SMEs being significantly different than large organizations, a gap in the existing research is apparent. A few studies to date have tackled this challenge [1] [13] providing some insights into the dynamics of ERP implementation at SMEs, however a formal list of influential factors or conceptual framework has yet to be presented.

METHODOLOGY

Case study research is preferred when current perspectives seem inadequate, as theory exists for large organizations but the environmental context (SMEs) is different [4]. The multi-case research method allows a deeper understanding of processes and outcomes of phenomena, the chance to test (other than just develop) hypotheses, and a good understanding of locally grounded causality [12] when compared

to either a single-case or survey-based research approach. In accordance with the norm for building theory from case studies, this research is based on theoretical sampling, where cases are chosen for theoretical rather than statistical reasons [4] and with the intent of enabling literal and theoretical replication [20]. This research required participating SMEs (1-499 employees) to have completed an ERP implementation that involved the majority of the modules contained in their ERP software within the previous 36 months. This research was successful in accessing five case study companies exceeding the minimum number of four case studies required for multi-case research [4]. Thirty-four separate interviews were conducted with twenty individuals with the following roles: internal project leader, Chief Executive Officer, accounting manager, operations manager, and internal project team member. Multiple sources of evidence, or triangulation [20] [4], were employed: (i) project documents were requested to provide methodological triangulation and (ii) high priority questions were asked to multiple interviewees to provide data triangulation. Content analysis, based on developing and applying a coding scheme to make valid inferences from qualitative data, was then employed adhering to recommended methods [19]. One hundred and fifty pages of interview transcripts were categorized into 1135 separate units of text. Our study defined success relating to the extent that potential benefits were achieved, the costs associated with achieving those benefits, and the duration since going live since more categories of project benefits tend to be realized over time. Benefits were classified into operational, managerial, IT infrastructure, strategic, and organizational categories as a starting point [16] and were further detailed based on the literature [15] [7]. Cross-case analysis was then conducted, comparing successful and unsuccessful projects, to improve the researcher's understanding and explanation, and to increase generalizability of the findings [12].

FINDINGS

The five companies described common motivations for implementing a new ERP system, namely legacy system issues (lack of integration, untrustworthy data, etc.) and the need for a scalable solution to handle business growth. At a minimum, they were all utilizing the purchasing, sales, inventory, and accounting modules of their ERP packages. Softwares "A" and "B" were used in both successful and unsuccessful implementation projects, indicating that implementation success did not appear dependent on software. A conceptual framework was developed based on the cross-case analysis where influential factors are organized into three chronological categories.

Project Foundation

Management Support included both financial (expenditures on consulting services and training) and cultural (encouraging staff positively towards the implementation). Motivation for ERP occurred only when employees were personally frustrated with their legacy system. Company's where Operational Processes (information / paperwork flows) were consistent under their legacy system appeared to have more successful implementations. Incorporating user input into the Software Selection decision created a sense of ownership in the users' eyes, while exclusion contributed to resentment towards the project.

Project Team

External Consultant quality was a combination of business understanding, software knowledge, and soft skills - the ability to effectively interact with others, with soft skills being the most influential of the three. Successful Internal Project Leaders had strong interpersonal skills and the ability to conceptualize how the ERP system was integrated. Small Internal Project Teams (less than five members) experienced

more success than large implementation teams that were based on the "representation from each department" concept.

Project Implementation

Effective Project Management, specifically formally documenting project progress, decisions, etc. positively influenced project success, and was more likely to be completed when assigned to an external consultant. Effective Software Testing proved challenging for companies that chose to significantly modify their ERP system due to a lack of available time and IT experience. Providing Training and Education beyond strictly the software appeared to help if employees lack formal education in their area of responsibility. Addressing employee Change Management concerns appeared to have influenced implementation projects only at the medium sized companies (50-499 employees).

DISCUSSION

Perhaps the primary difference between carrying out an ERP implementation at a SME and at a large organization relates to the extent that the internal project leader and team members can be alleviated of the regular responsibilities during the project. It was recommended in the literature based on large organizations that the internal project team should be dedicated to the project full-time, away from everyday operations and distractions [18] [10]. Our study found that alleviating team members of the majority or all their regular responsibilities simply did not occur at the participating SMEs. This appeared to be a major undercurrent that influenced many of the factors that affected project success at the SMEs. Some of the SME specific influential factors identified did appear to be similar to the existing body of knowledge based on large organizations, such as the importance of management support [2] [5] [14], and formal project management [2] [5] [14] [17]. Other influential factors were further refined specifically for SMEs, such as including all users in software selection process, the importance of the external consultant's soft skills, employing small implementation teams rather than the representative from each department approach, and formally educating employees on business "best practices" in addition to specific software functionality. Finally, some influential factors for SMEs were newly identified, such as consistency of operational processes and the ability to effectively test the software internally with limited available time and limited IT experience.

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