

Analyzing Factors for the Successful Implementation of Enterprise Resource Planning System in UAE Organizations

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Abstract: The purpose of the research was to analyze the factors affecting the successful implementation of enterprise resource planning (ERP) systems. A qualitative research approach was used to facilitate the realization of the study purpose. ERP systems provide decision-makers with suitable and accurate information and also enable them to foresee the outcome of their decisions. The main objective of this present research study is to determine the relationship among factors—project management (PM), top management support (TMS), strategic decision making (SDM), communication (COMM), minimum customization (MCUST), business process alignment (BPA), user training (UT), and testing of application (TA)—and the successful implementation (IM) of ERP systems in the United Arab Emirates (U.A.E.). The academic implications of this study are that there are vast gaps between what has been investigated within the field of Implementation of ERP and the perception of the system users. The findings of this study, which fill these gaps, can be used by companies who want to understand what makes an implementation of ERP work in relation to their system users and by researchers in conducting further research within the scope of this field.

Keywords: ERP, ERP Success Factors, ERP Implementation.

I. Introduction

In the modern age, companies, for every aspect of management, rely heavily on information to thrive. In today's competitive market, organizations have to adapt themselves to the continuously changing and evolving conditions to survive and develop. Therefore, organizations' decisions during this adaptation process are critical. During this process, to take appropriate decisions, organizations must have a good understanding of their own system dynamics, its current position and status in the market, as well as the ever-changing dynamics that impact and affect the world, the country, the sector, and the organization itself. It is of utmost importance that people in-charge of decision-making are facilitated by means of information systems particularly with Enterprise Resource Planning (ERP) systems as well as equipped with appropriate and correct info. They must also be capable of predicting the consequences of their decisions, and the overall impact on supply chain (Wu & Pagell, 2011). There has been a boost in

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recent years in the adoption of ERP systems by various organizations in several sectors. The key factor driving the increased adoption of ERP are the advantages guaranteed by ERP systems including a range of operational managerial, organizational, strategic, and IT infrastructural benefits (Caserio & Trucco, 2018). The aforementioned benefits lead to greater productivity and customer service besides extending support for organizational changes, and curtailment of IT cost.

Recent studies, however, have shown that many organizations face challenges in grasping the anticipated advantages of ERP systems. It has come to knowledge, that ERP advantages for adopters are not always obvious. It has also been noted that these advantages can differ across various industries and vary for different organizations opting for the ERP system (Matias & Hernandez, 2019). The difficult process of implementation and high frequency of ERP failure cause problems in the adoption of this system (Shaul & Tauber, 2013). Setting up ERP involves coordinating many different tasks, and most of the individuals in a business are involved (Uçaktürk & Villard, 2013). Implementation of ERP systems stands separate from that of conventional systems, owing to large-scale adjustments, degree of complexity, increased organizational effect, a requirement for a large number of participants, high costs, and a substantial risk of business impact (Kasemsap, 2016). Haddara and Elragal (2015) considered critical success factors (CSFs) as the major field towards which companies should shift their primary focus so that they can attain the most gratifying results of implementation of ERP systems. Chou and Chang (2008) believed that critical success factors provide a strong premise for understanding what criteria should be pursued during ERP systems implementation.

Fortunately, ERP availability is no longer only limited to developed countries as developing countries are now also reaping its benefits. Currently, ERP is seen as a multipurpose force for business accomplishments due to its outstanding potential for executing sound transactions and productions. It is for these reasons that a number of business organizations are now extensively using ERP systems to manage their own system's resources and various other business projects. The primary reason for the implementation of ERP systems in developing countries to maintain equal footing with worldwide economic growth. It is a way of competing with Western Enterprises that are constantly pressurizing and hindering development for developing countries.

Conversely, ERP implementation has posed great challenges for many countries in the Middle East including Lebanon, Bahrain, Qatar, Saudi Arabia,, Oman, Kuwait, Syria, and the United Arab Emirates (U.A.E). Factors that are posing challenges for these countries range from cultural disparity, refusal to accept the new framework, insufficiency of information technology, and dearth of experience and government approaches. Another limiting factor of ERP implementation, particularly in developing nations of Middle East, was the reluctance of the users to use the system. The success of any organization is highly dependent on the successful implementation of an ERP system. On this basis, the following are the objectives of this research study:

- To determine the relation of factors such as project team, top management support (TMS), strategic decision making (SDM), communication (COMM), project management (PM), minimum customization (MCUST), business process alignment (BPA), user training (UT), testing of application (TA) with the successful IM of ERP in the organizations in the U.A.E.

- To assess how these factors, affect the successful implementation of ERP in organizations in the U.A.E.

The structure of this article is organized accordingly. In Section II, we discuss the Literature review followed by research methodology in Section III. Section IV shows the analysis of data and interpretation of results followed by the discussion of results in Section V. Finally, the last section provides the conclusion of the current study and suggests future guidelines for work.

II. Literature Review

Since long ago, businesses have been operated as an organizational structure with distinct functional domains; hence, each of these functional domains differentiates the departments within organizations. Therefore, there is a complete separation among all functional departments. Therefore, it may be deduced that what happens in a particular department might not be linked to other departments. However, there is interdependence among these departments, with each needing data and information from the others.

ERP, known as Enterprise Resource Planning, is basically an enterprise-wide information system that helps in the movement of information and the management of different resources and functions of an organization. The system generally supports the following functions: inventory, manufacturing, distribution, shipping, logistics, accounting, and invoicing. Using the ERP system, the relations with external stakeholders can be managed, and performance management can be improved. ERP systems employ a centralized database and typically depend on a shared computing platform. It offers an integrated, uniform, and coherent environment to the user.

ERP is one of the most recent technologies to have been adopted by various organizations (Haddara & Elragal, 2015). An organization-wide platform incorporates all essential functions of an organization into a single system with a central database. It is possible to customize these software packages in a way that they are in accordance with the particular requirements of different organizations (Candra, 2012). However, most of the ERP projects did not have adequate success and could not attain all the required outcomes (Disney, 2018). Moreover, ERP project implementation is very costly, and therefore, organizations need to ensure that the project attains success and provides benefits as soon as possible (Al-Mashari, 2003). Hence, it is important to examine the factors that ensure that the implementation of ERP project is successful.

A. Implementation of ERP

ERP is a tool that allows a business to gain a competitive advantage over its rivals by incorporating the use of ERP applications in all the business processes. Many firms have already installed or are in the process of installing packaged ERP systems for their business activities. The market shares of ERP vendors have augmented significantly in recent years, showing growth in the number of firms that are using ERP (Elbardan, & Kholeif, 2017). The three major ERP vendors are SAP, Oracle, and Sage. SAP earned \$6 billion in ERP software income, resulting in a market share of 24.6 percent, while Oracle earned \$3.12 billion and had a market share of 12.8 percent (Ali & Miller, 2017). The revenue of Sage

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amounted to 1.5 billion and had a market share of 6.3 percent (Ali & Miller, 2017). The sellers constantly update their products and add newer technology-based characteristics due to the intense competition to gain more share in the profitable market of ERP.

An ERP system may be implemented stepwise or in a single step. The organization's method of the IM of ERP is dependent on organizational structure, management structure, and the policies or rules of the firm (Fayaz, Kamal, Amin & Khan, 2017). In the case of multinationals, firms will prioritize implementing the enterprise system in phases as a multinational is stretched out in different areas with different systems. When multinationals use similar and common systems and techniques, ERP can be implemented at once (Costa et al., 2016). Thomson (2011) believed that individual, organizational, and group characteristics play significant roles in the success of implementation of ERP. The individual characteristics are knowledge, psychological abilities, and incentives. The group characteristics include goals, roles, ethics, and problem-solving, and the organizational characteristics are strategy, resources, rewards, culture, and structure (Abdelmoniem, 2016; Bansal & Agarwal, 2015). There are nine reasons for the failure of implementation of ERP, as stated by Marnewick and Labuschagne (2005). These reasons are changes, communication issues, finance issues, customization issues, less or no experience, unfriendly user interface, poor ERP selection, and the absence of consultant/supervisor. Caserio and Trucco (2018) considered several other reasons that contributed to the failure; these are considered poor top management participation, poor PM, lack of education and training, non-acceptance of a new system, impractical expectations about the IM of the project, erroneous data, and disparity between the business and the chosen ERP system.

The implementation of ERP is an integrative procedure that requires ample time as well as appropriate coordination among various departments of the organization Chow (2018). However, this has been seen differently by every author studying issues related to the implementation of ERP. Some considered two factors while others considered many other factors, which can be up to 20 or even more than that (Thomson, 2011).

B. Success factors affecting the implementation of ERP

1. Project Management

Previous studies provide an understanding of how and why executives decide to utilize and adopt information technologies in their organizations. From a formal perspective, senior executives play a vital role in creating an acceptable environment for the optimal utilization of IT by making knowledgeable choices (Garg & Garg, 2014). Project management (PM) follows a hard model in which the minimization strategy is adopted. For example, projects are managed with the help of work breakdown and critical path analysis that are appropriate in the case of single PM, and this is the reason why single PM is being widely recognized in the industry (Giachetti, 2016). Very few research studies have been performed to study ERP in the context of PM or to evaluate the applications of PM. The present technique cannot offer gears and methods to ensure effective implementation of ERP. To control and administer any organization, the most vital choice is accepting and executing successful PM gears, methods, and values. This requires the executives to be independent and powerful enough to proceed with the IM process. An implementation of ERP shall not be taken as a mere computer

venture, it requires a tactical approach. ERP frameworks are integrated applications that influence the whole company (Thomson, 2011). ERP ventures, though usually taken as general information system ventures, are distinguished from the conventional data frameworks since they attend to choosing and executing the available programming packages instead of only concentrating on creating new customized applications (Shi & Halpin, 2003). This is crucial since, usually, ERP project requirements are not specific, and the professionals offer a particular software solution for the project without any consideration of its specifications.

The research provides the authors insights regarding the use of the PM life cycle theory, which is vital for successful implementation of ERP and is the least expected to fail. Tsai et al. (2011) introduced Reliable PM information as well as the motivation to make changes and bring improvements to the business processes also proved to be the main motivating factor behind the effective implementation of ERP (Saade & Nijher, 2016). Tsai et al. (2011) performed extensive research to formulate eight achievement levels of PM; they are as follows: (1) accomplishment of business IM objectives, (2) extensive support of the senior management, (3) accomplishment of goals, (4) accomplishment of budget targets, (5) activation of effective communication (6) problem solving, (7) system integration, and (8) user acceptance. Through extensive study and practical examination, it was deduced that consultant criteria, PM, and performance enhancement were interlinked, and accordingly, any changes to either one of these induced changes to the others, ultimately affecting the performance enhancement of implementation of ERP. Saimagambetova and Imashova (2017) found that the PM theory and techniques were used to formulate enterprise information, corresponding to the general planning and principles that had to be followed step-by-step for the IM of ERP in business with a consideration of various factors of effective planning, organization, management, and monitoring for the accomplishment of organizational goals and organizational benefits.

Bansal and Agarwal (2015) argued that there was a greater chance that users might find solutions to issues arising during the IM of ERP on their own without asking for help from consultants who lack the support skills. Blau and Khan (2017) uses PM significantly influences the success of ERP implementation, and is in line with research of Mittal (2016). However, contrary to research conducted by Purwanto, Hadi, Rahardianto (2014) and Susanti, Hapsari (2017).

2 Top Management Support

It has been unanimously agreed that top management support (TMS) can be defined as the level of resources, directions, guidance, and power offered by the senior management before and after the IM of IT systems such as ERP (Beheshti & Beheshti, 2010). It has been observed that other members of the organization appreciate the public display of support from top managers and, consequently, feel encouraged to participate in such successful projects as stated by Poston and Grabski (2001). Bradford and Florin (2003) have defined top management as the involvement of the management in information system projects. According to Somers and Nelson (2001), TMS refers to the degree of understanding of implementation of ERP by top managers as well as their contribution towards it. TMS has also been described by Gupta (2000) as the extent to which top managers recognize the importance of information systems and the degree of their involvement in the IM of such projects. The success of implementation of ERP is closely linked to TMS, as indicated by several studies (Poston & Grabski,

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2001). Brown (2010) found a relationship between TMS and successful implementation of ERP. As per this research, the more the top management invests in terms of provision of support and adherence to implementation of ERP, the greater are the chances of successful ERP adoption. This support goes further by proving to benefits after the IM has taken place. In another similar study, which was also conducted to establish a relationship between TMS and implementation of ERP, by (Hitt et al., 2002), the results illustrated a positive relationship between the two. Desirable results can only come about as a result of dedication and support from the top management during the entire process of implementation of ERP. Hossain et al. (2002) managed to find out that wholehearted participation from the top management has favorable effects on the success of ERP. A positive relationship was identified between TMS and information system success by Shaul and Tauber (2013). The IM of ERP is more likely to occur if devoted and persistent support is provided by the different departments of an organization (Morris & Venkatesh, 2010).Larteb, Benhadou, Haddout, and Nahla (2016) using the company's top support variable and significantly influencing the success of ERP in their research, is also in line with research by Mitra and Mishra (2016), and Thakur (2014). While in contrast to the research conducted by Baykasoğlu and Gölcük (2017) used the company's top support variable in his research and there was no significant effect on the success of ERP.

The top management has a crucial role in every organization. For ERP, the management needs to communicate the company's strategy to its employees, recognize realistic objectives for implementation of ERP, and work towards achieving those objectives with the utmost dedication. It is evident from previous studies that if a business needs to achieve its targets, there needs to be the availability of immense support from the top management. Modifications in software and hardware are included in Implementation of ERP as well as changes in business processes. ERP success is also dependent on senior-level support, funding, competition, and participation.

3. Strategic Decision Making

The third CSF of the model for the IM of an ERP system was strategic decision making (Rao, 2000). The business processes of an organization can be better understood by thoroughly analyzing and contemplating a strategy. This skill is imperative when it comes to the IM of an ERP (Ali & Miller, 2017). Definite goals and a business plan that takes into account strategic and tangible benefits, costs, resources, risks, and its timeline are crucial for the success of a project.

In 2007, Woo carried out an investigation related to strategic decision making. The study investigated the concerned factor in the context of user perspective; in this study, Woo (2007) emphasized that users perceive that senior managers should come up with a strategic approach for implementing ERP. The absence of a strategic approach will cause a general lack of understanding or misinterpretations regarding the benefits of changing an older system. This will, in turn, create suspicion among the users regarding the change and its advantages (Certo et al., 2016). From this study, it can be deduced that most users acknowledge the significance of the concept of strategic decision making and its potential advantages for ERP system IM.

Senior managers perceived that setting explicit goals and objectives and obtaining assistance from experienced implementation of ERP professionals can make the IM process more efficient and less time

consuming as per Caserio and Trucco (2018). It has been found that project managers highly recommend the creation of clear aims and objectives when initiating a project in order to ensure correct understanding of IM of ERP and enable a smooth and hassle-free IM process (Saide & Mahendrawathi, 2015).

4. Communication

All stakeholders need timely updates on the progress of their organization. For this purpose, the communication system within the organization needs to be effective, along with a clearly defined timeline and implementation strategy. According to several researchers, there are two types of implementation of ERP—centralized or decentralized. Deciding the type of implementation of ERP is crucial since this affects costs. Implementation of ERP also includes various unanticipated costs. Hence, the budget must not involve supposition and speculation and should offer flexibility (Sarker & Lee, 2003).

For any implementation of ERP project, the most difficult and challenging task is communication. This aspect is considered to be one of the CSFs by various researchers (Dechow & Mouritsen, 2005). Project team information sharing, IM approval, and thorough understanding can only be achieved through effective communication. Within each IM stage, the results and goals must be shared with the entire organization. Communication not only helps attain user acceptance and approvals but also assists in obtaining the required final acceptance for the initiation of IM. This communication must commence during the early implementation of ERP project stages and should integrate the system overview as well as the purpose behind the IM.

5. Minimum Customization

There are various software modules within ERP systems; therefore, organizations must establish business processes that make use of these modules as well as employ the best practices for the attainment of limited customization. If the ERP system is customized to a significant level, it will be considered ineffective (Ifinedo, 2014). The ERP software should be fully integrated within the vision and mission of the organization. The goals should be quantified, and planning should integrate appropriate risk management processes. To attain the advantages of implementation of ERP, benchmarking procedures should be included (Hossain et al., 2002). It is essential to recognize the critical paths and milestones through the PM process. Moreover, project IM must be actively monitored (Somers & Nelson, 2001). Minimum customization is the seventh CSF present within the framework (Seethamraju, 2015). If the ERP software is customized, it will take a while for the IM process to occur (Sarno & Herdiyanti, 2010). Zhang et al. (2003) stated that it is essential to maintain a business environment that is stable and successful. Moreover, data exchange should take place throughout the organization and that is only possible if there are availability and openness of data and information systems (Shaul & Tauber, 2013). For an efficient ERP system IM, a critical factor is the appropriate data. It also helps avoid any dispute between user departments. It is also essential that the management makes sure that no changes are made to the ERP system by any department.

6. Business Process Alignment

Business process alignment (BPA) is the ninth CSF that has been extracted from the framework (Beheshti & Beheshti, 2010). Through this reengineering procedure, the information and culture in

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the organization can be altered. Once the system is cleaned, a balanced approach can be attained from the implementing company and the vendor (Kurbel, 2016). The business process must be reengineered for the ERP system to be implemented. Users would be less reluctant to absorb this change if the process is carried out appropriately (Basoglu et al., 2007). The functionalities of the ERP system and the business process should match properly (Somers & Nelson, 2001).

According to Stratman (2007), throughout the various product stages, customization and BPR are quite vital. Organizations are required to review the business process for the ERP project. They must inspect the activities already embedded within their system. BPR has been defined as necessary reorganizing and major redesigning of the business procedures for the attainment of dramatic enhancements within developed and critical measures of performance such as speed, quality, and cost (Beheshti & Beheshti, 2010). Bradford and Florin (2003) suggested that the business should be aligned with new standards, process-design, and skills. Special considerations regarding technology infrastructure planning and ERP interface quality enhancement need to be carried out during this phase (Dechow & Mouritsen, 2005). Packaged software limitations include the conflict risk that arises between organizational requirements and the present business procedures (Saide & Mahendrawathi, 2015). All individuals within the boundary of organizations are allotted responsibilities, which is why the core business process must be recognized before any reengineering process is carried out. This process is usually not evident since they are never recorded (Bansal & Agarwal, 2015). When a new system is being implemented, BPR plays a vital role, usually at an early stage that starts with an introduction and ends at adoption. Its importance level declines when the technology becomes a routine and is included within the organization's business procedures (Hoch & Dulebohn, 2013). The business process outcome that is expected to be generate after the IM is influenced by the BPR. BPR is another significant aspect of the success of implementation of ERP (Saade & Nijher, 2016).

7 User Training

Employees and their roles are influenced by implementation of ERP. Various alterations are made to user roles and duties as the ERP's influence on corporation occurs within processes, departments, and data integration and structures. Initially, employees are required to manage complex and developed systems. The business process is significantly influenced by the ERP since it offers various functionalities. Employee roles are changed due to the integration of process and functionality. The work carried out by the employees each day changes due to the integration of process, data, and department. After the database becomes united and logical due to the business process proceedings, individual and department interdependencies increase. The ERP subjects a significant amount of influence on the employees; thus, training is vital for the success of ERP.

One of the reasons behind the failure of implementation of ERP is an inadequate level of training of the employees and their inability to comprehend the system. Various scholars stress the importance of training employees. The organizations in Iraq that have implemented ERP were empirically analyzed by Dezdar and Ainin (2011) to identify the aspects that affect implementation of ERP. The results of this study indicated that ERP is complex and that is why appropriate education and training, in an effective and efficient manner, should be provided to the end-users. Through this training program, their knowledge and expertise are enhanced, along with their overall performance within the organization. If the training is sufficient, the profitability of the ERP system also enhances. These programs also help

organizations establish a positive attitude toward implementation of ERP (Stratman, 2007). The outcomes of implementation of ERP may not be desirable if appropriate training is not offered (Somers & Nelson, 2004). The end users need to be educated on how data and information are to be input and also learn the completely new process (Dey et al., 2010).

The training phase of implementation of ERP is influenced by CSFs that are listed by Morris and Venkatesh (2010). These factors are project management, support from senior management, user training commitment, training budget, and skills and expertise of the employees. The training requirements for implementation of ERP are quite extensive as well as expensive (Brown, 2010). Nearly 10–20 percent of complete IM of ERP projects are taken by training programs (Somers & Nelson, 2001). Hence, in order to sustain the program, top management and executive commitment are required.

8. Testing of Application

Software testing is the tenth CSF that has been extracted from the framework (Dechow & Mouritsen, 2005). In order to manage a successful IM, it is necessary to test the new ERP system (Shi & Halpin, 2003). Usually, companies regret their decision of not focusing on the testing phase and not providing enough time to make the desired changes (Kurbel, 2016). IM can be simplified by conducting sophisticated and rigorous testing since data can be altered and cleaned to provide a smooth IM process (Poston & Grabski, 2001). The generic perspective of software testing has been accepted by Ziemba et al. (2011) who suggested that before implementing a system, it is necessary to test the system adequately.

Within the software development cycle, software testing is not only essential but also costly and time consuming (Hoch & Dulebohn, 2013). The testing process is only considered effective if it can extract and organize the system such that it may be implemented smoothly (Costa et al., 2016). Low human engagement during the testing process and steadiness of the reusability of technology are the factors that help support test automation (Bradley, 2008).

In the industries, testing efficiency is attained by automating the processes for software as well as hardware components (Umble et al., 2003). At present, there are advanced testing tools that automate the association of the Graphical User Interface level software systems (Hoch & Dulebohn, 2013). Yet, even after many developments, the industry cannot extend the knowledge regarding testing tools usability and application (Bansal & Agarwal, 2015). The best practices for test automation include preparing automated testing applications, automation team member organization, automation test plan design, automation success criteria definition, relevant test case development, relevant test tools selection, and automated testing IM (Sarno & Herdiyanti, 2010). Within the software industry, software and system testing are considered quite significant. System and software testing plays a vital role in the traditional waterfall development life cycle. There are various definitions of system testing (Bansal & Agarwal, 2015). The testing is an analysis process in which the software item is assessed to identify the difference present within the desired and present condition (bugs) and to evaluate the software item characteristics. Hence, system testing helps identify the gaps of the developed system or functions considering the desired results that have been stated by the present or earlier customer needs (Maas, Fenema, & Soeters, 2016). Within system testing, verification and validation are two vital aspects. The software development industry uses several methods and technologies to execute the

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software system debugging and testing. These techniques differ from one another since they are based on the system types and organization or software perspectives. System testing is considered a holistic activity since it is initiated from the requirement analysis phase and then is part of each phase of software/system development life cycle.

D. Research Gap and Significance of Topic

The implementation of ERP and the related CSFs have been extensively analyzed. The results indicate that the researchers mostly analyzed CSFs from the perspective of the management that implies the user perspective was not taken into view by most researchers (Schuh, 2017). Keeping the abovementioned information in mind, the current research would focus on establishing a framework that would manage the ERP implementation process within the organizations in the U.A.E. The current literature has been analyzed, and from that analysis, it was found that the CSFs had not been researched thoroughly to attain the successful implementation of ERP within the organizations in the U.A.E. Various gaps are present in the literature, which is why it is essential to conduct research on this topic. The present research would extract the variables responsible for influencing the implementation of ERP process and to provide a guidance model for effective implementation of ERP in the organizations in the U.A.E. The subsequent section will present the methodology adopted to carry out this research. An organization can only maintain its competitiveness if they are able to recognize their strengths and efficiently use the ERP system to consolidate relevant information. Hence, the objective of the present research is to identify the association of factors such as top management support, project team, communication, strategic decision making, minimum customization, project management, user training, business process alignment, and application testing with the ERP successful IM within the U.A.E. organizations. Keeping this aspect in mind, a conceptual diagram has been built by the researcher to help them to move ahead with the research. Figure 1 presents the conceptual diagram for the current study.

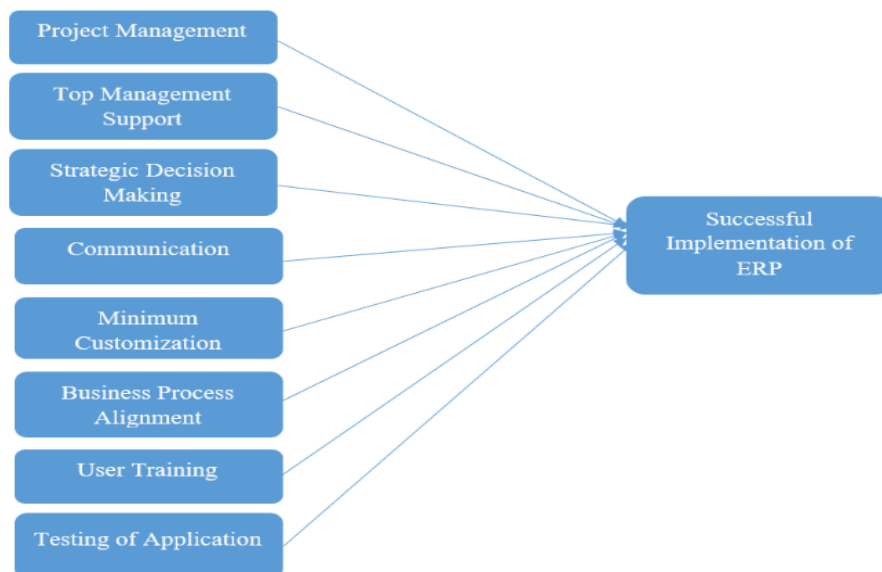


Figure 1 Conceptual diagram
Source: Developed by the Author

III. Research Methodology

After the researcher enlightens themselves with the literature of the research topic, an appropriate research approach is required. It is essential to reach a conclusion for proving a hypothesis, which will establish the framework of a research process. It is fundamental for any examiner to outline a legitimate research philosophy in order to make the process easier. It should be noted here that although the reality of the situation might prove that an equivalent research technique may be utilized for two inquires, the outcome might be totally different. This shows that research is very subjective and is subject to change.

A research approach deals with the wide structure in place to arrange the assessment or the exploration. The strategy for information assortment could be of two types. The first is inductive and the other is deductive. For this particular research, a deductive kind of research was used. A deductive perspective is a technique where there is a huge amount of data that is assembled from the beginning and that data is concentrated to go to a particular direction, which means going from broad to specific. Then, relevant theories are tried against the data amassed from the literature (Jaramillo & Chen, 2016).

Research strategy isolates each and every progression in the fundamental research with the objective to ensure that it is straightforward and, furthermore, that it is reasonable enough to fathom and comprehend what might be the accompanying stage in the examination and what the final product might be. As indicated by Saunders, Lewis, and Thornhill (2016), having a proper research methodology is crucial since it spares time and also aids in clearing any clutter present in the examination. Bryman and Bell (2018) are of the view that any proper research system helps correctly perceive the techniques in an appraisal that, as time goes on, should be followed to indicate the time and the assets required to complete the examination.

Quantitative research is a system that investigates numbers when information is being gathered for any reason. Quantitative research fuses the utilization of computational, quantifiable, and coherent instruments together to get the necessary information for results. Its principal objective is to check the recurrence or the effect in numbers with the help of which the theory would be confirmed. Investigation becomes increasingly legitimate and solid when more individuals are involved for gathering information. The respondents were identified considering the population diversity of the U.A.E. The sample comprised of various employees working in the organizations in the U.A.E. The researcher was able to collect data from 126 respondents which were used for data analysis.

According to Cresswell (2003), two types of hypotheses are used in research: null assumptions and alternative beliefs. The primary goal of the current study is to examine what affects successful IM of ERP systems in the organizations in the U.A.E. Therefore, the aim of the present research is to recognize the relationship between IM and factors related to the organizations in the U.A.E. such as project management, top management support, strategic decision making, communication, minimum customization, business process alignment, user training, and testing of application. The objectives of the current research can be achieved through a quantitative hypothesis, which is proposed to test the

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above-mentioned factors. To fill the gap in the literature, the study defined the following hypotheses to answer the research objectives:

H1₀: There is no significant relationship between project management and successful implementation of ERP system in the organizations in the U.A.E.

H2₀: There is no significant relationship between top management support and successful implementation of ERP system in the organizations in the U.A.E.

H3₀: There is no significant relationship between strategic decision making and successful implementation of ERP system in the organizations in the U.A.E.

H4₀: There is no significant relationship between testing of application and successful implementation of ERP system in the organizations in the U.A.E.

H5₀: There is no significant relationship between user training and successful implementation of ERP system in the organizations in the U.A.E.

H6₀: There is no significant relationship between business process alignment and successful implementation of ERP system in the organizations in the U.A.E.

H7₀: There is no significant relationship between minimum customization and successful implementation of ERP system in the organizations in the U.A.E.

H8₀: There is no significant relationship between communication and the successful implementation of ERP systems in the organizations in the U.A.E.

H9₀: The factors related to the successful implementation of ERP systems do not influence the successful implementation of ERP systems in the organizations in the U.A.E.

A quantitative research method was used in the current study. Accordingly, a questionnaire was used to gather data to examine the factors affecting successful implementation of ERP systems in the organizations in the U.A.E. Next section will present the data analysis.

IV. Research Findings

1. Descriptive Statistics

All results and assumptions tested in this section are based on single indices that were created for all multi-item factors, namely project management (PM), top management support (TMS), strategic decision making (SDM), communication (COMM), minimum customization (MCUST), business process alignment (BPA), user training (UT), and testing of application (TA). Summary statistics include a measure of central tendency, that is the mean in this case, a measure of dispersion (a spread of distribution), such as standard deviation, and a measure of distribution, such as skewness and kurtosis, which demonstrates how much a distribution varies from a normal distribution.

Table 1 shows the mean values and standard deviations of all the main factors for the current study. It also shows the benefits of skewness and kurtosis of the primary variables. Skewness and kurtosis are essential for testing the assumption of normality that multiple regression analysis requires. According to the rule of thumb, a variable has a value close to normal distribution if its skewness value or kurtosis

values are -1.0 and +1.0. The researcher has used the criteria in which both the skewness and kurtosis of the distribution fall between -1.0 and +1.0 (Hair et al., 2014).

Table 1 Descriptive statistics for factors (N = 126)

	Mean	Std. deviation	Skewness	Kurtosis
PM	5.77	0.996	-1.135	2.487
TMS	5.74	0.967	-1.075	3.295
SDM	5.73	0.990	-1.350	4.347
MCUST	5.63	0.873	-1.059	3.416
BPA	5.63	0.956	-0.790	1.652
UT	5.71	1.05	-1.238	3.316
IM	5.65	1.06	-1.245	3.791
COMM	5.56	0.940	-0.741	1.488
TA	5.76	0.988	-1.210	3.542

2. Relationship between Dependent and Independent Variables

In this section, the researcher tested the hypotheses mentioned in section III: The researcher used the Pearson correlation coefficient to test the above-stated hypotheses. Table 1 summarizes the results of the statistical test. Table 1 shows the value of R statistics for variables.

Table 2 Results of Pearson Correlation

Dependent variable (Implementation of ERP System)		
Independent Variable(s)	R	Result
PM	r = 0.89	H1 ₀ Rejected
TMS	r = 0.74	H2 ₀ Rejected
SDM	r = 0.84	H3 ₀ Rejected
MCUST	r = 0.88	H4 ₀ Rejected
BPA	r = 0.76	H5 ₀ Rejected
UT	r = 0.83	H6 ₀ Rejected
COMM	r = 0.80	H7 ₀ Rejected
TA	r = 0.78	H8 ₀ Rejected

The next hypothesis is “H9₀: The factors related to successful implementation of ERP systems don’t influence the implementation of ERP system in the organizations in the U.A.E.” To test this hypothesis, the researcher conducted a multiple regression analysis. The researcher tested the conceptual model using regression analysis. The model involves evaluating the effects of indicators or components of independent variables (project management, top management support, strategic decision making, minimum customization, business process alignment, user training, communication,

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and testing of application) on the implementation of ERP system in the organizations in the U.A.E. The Table 3 highlights the results.

Table 3 Model summary multiple regression

Model summary				
Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.902 ^a	0.814	0.801	0.47533
a. Predictors: (Constant), TA, PM, MCUST, COMM, SDM, UT, BPA, TMS				

Table shows that predictors (TA, PM, MCUST, COMM, SDM, UT, BPA, TMS) can explain at least 80.1 percent of the variance in IM (Adjusted R Square = 0.801). Table shows the results of one-way ANOVA: $r = 0.902$, $F(8,117) = 63.847$, $p < 0.05$. The probability of the F-statistic (63.847) for the overall regression relationship is < 0.001 and is significant. Table 5 shows that the independent variables are statistically significant to explain the dependence on the dependent variable (successful implementation of ERP). The results also indicate that user training is the most important variable (Beta = 0.360) for the successful implementation of ERP system in the organizations in the U.A.E. Other variables in the order of their influence are as follows: SDM (Beta = 0.380), COMM (Beta = 0.319), MCUST (Beta = 0.305), TMS (Beta = 0.298), PM (Beta = 0.241), BPA (Beta = 0.239), and TA (Beta = 0.235).

Table 4 Analysis of variance (TA, PM, MCUST, COMM, SDM, UT, BPA, TMS)

One-way ANOVA ^a						
Model		Sum of squares	Df	Mean square	F	Sig.
1	Regression	115.406	8	14.426	63.847	0.000 ^b
	Residual	26.435	117	0.226		
	Total	141.842	125			
a. Dependent variable: IM						
b. Predictors: (Constant), TA, PM, MCUST, COMM, SDM, UT, BPA, TMS						

Table 5 Regression coefficients (TA, PM, MCUST, COMM, SDM, UT, BPA, TMS)

Coefficients ^a						
Model		Unstandardized coefficients		Standardized coefficients	T	Sig.
		B	Std. error	Beta		
1	(Constant)	-0.225	0.300		-0.750	0.005
	PM	0.257	0.079	0.241	3.272	0.001
	TMS	-0.328	0.106	0.298	-3.092	0.002
	SDM	0.409	0.100	0.380	4.086	0.000
	MCUST	-0.006	0.081	0.305	-0.075	0.000
	BPA	0.267	0.102	0.239	2.604	0.001
	UT	0.262	0.088	0.360	2.967	0.004
	COMM	0.135	0.102	0.319	1.321	0.001
	TA	0.037	0.087	0.235	0.431	0.000

a. Dependent variable: IM

V. Discussion of results

The findings of the research show that the factors that affect success of implementation of ERP systems are categorized as project team, top management support, strategic decision making, communication, project management, minimum customization, business process alignment, user training and testing of application, and their effect on the implementation of ERP applications in U.A.E has been studied. Although, these factors have already been studied by other researchers in context of different countries (Poston & Grabski, 2001), the results of the current study reveals that these factors have a strong positive relationship with the implementation of ERP projects in the organizations in the U.A.E

ERP has become a key business driver in today’s world. Organizations are also trying to reap the benefits of the technology. ERP is, essentially, an integrated software solution used to manage a company’s resources. In order to find out factors affecting the ERP system, hypothesis was conducted for the ERP implementation like, top management of organization, project management, Strategic decision making, business process alignment, customization unit, training department, communication department, application testing unit in the UAE’s organizations. From earlier studies, it was concluded that top management’s contribution is considered very important for successful ERP implementation (Poston & Grabski, 2001). Moreover, 45.2 percent of the user of the software agreed on the point that for ERP execution, the contribution of top management is important, but it is not assumed critical factor. Moreover, it was also suggested in one of the survey that it is a crucial mistake to hand over the entire process to the technical department (Stratman, 2007). The results of current studies shows that 50.7percent of user thinks that communication is one of the important factors in ERP implementation. The above result contradicts the outcome of another research according to which communication is not considered as an important factor as it may lead the information to waste (Hoch & Dulebohn, 2013). With regard to training, it has been found that appropriate training is mandatory for the implementation of ERP system successfully in all stages that are pre installation, during installation and

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after installation (Somers & Nelson, 2001). Thus, to bring up the positive staff reactions and acquire advantage from the new system is very important (Somers & Nelson, 2001). From previous research, the negative correlation was observed from which it was derived that when success of ERP increases, training and educating the staff needs decreases and vice versa (Somers & Nelson, 2001). According to earlier research, implementation team must involve in planning while motivating others. Hence, it is essential that the implementation team is led by an expert superior (Madanhire and Mbohwa, 2016). The result of this study also showcases a positive relation between successful implementation of ERP and business process alignment. This is why most of the users agreed that change in management is necessary in implementing an ERP system. (Caglio, 2003) contended the step in the change management process starts with the support of influencer. The results also indicated that positive responses were obtained from system users who considered user involvement as significant in this regard and no responses of strong disagreement or disagreement or slight disagreement were obtained. The findings of the current study also implies that respondents somewhat believed the BRP was a key factor in the success of ERP implementation. The possible problem of incompatibility of the new system with current processes hinders the fluidity in system installation; hence, preference is given to the application of packaged software (Somers & Nelson, 2004). Further, the results also shows that it is possible that there was no need to instigate the project support system as the implementation process was already consistent. however, it is conflicting to the idea proposed by (Light et al., 2001) which states that the support system requirement elevates with elevation in level of customization. Any of the aforementioned reasons can be enough. Still, the fact that project support is significant.

VI. Conclusion and Future Recommendations

The need for continuous flow of information becomes more pronounced as emerging companies worldwide are approaching globalization (Umble et al., 2003). ERP systems have been significantly recognized by the companies as crucial in the attempts to accelerate the flow of information, but the application of an ERP system can cost a lot of money and is complicated (Sarno & Herdiyanti, 2010). Although significant amount of research has been dedicated towards the factors that make implementation of ERP successful, only management perspective was considered in most of these studies (Davenport, 2000)

This research investigated the CSFs in implementation of ERP especially from the standpoint of a user as well as an administrative point of view. The scope of the research was to explore the under-exploited parts of the subject in examination. This research was meant to examine that niche of ERP for organizations in UAE. In the process of research, most commonly discussed CSFs were short-listed which additionally served as an overview to the former aspects of the study. Businesses and firms can avail this research to comprehend the driving force that operates applications of ERPs from a user standpoint. More so, the findings of this study can be utilized in future researches pertaining to this subject. The findings of the study quite explicitly imply that despite the complicated procedure of implementation, ERP implementation must be performed in such a way as to ensure employee participation and engagement. This is an implication of the study from a management perspective.

There are various resolves to the limitations of the study. For future researches, a different approach could result in a more prominent examination of the factors influencing the system user's point of view.

The implications of a regression analysis are manifold. It could be employed to analyze the specific attributes of the system users influencing CSFs that are deemed significant. Some of the characteristics include age of the user, educational status, and authoritative rank in the firm. Another resolve for future studies in the field can be to investigate diverse industries containing different firms from all around the UAE. This would help in highlighting any distinctions in the study due to the diversity of participating firms. This could further serve as an advantage when a new system is being formed. Thirdly, to address the differences between CSFs developed from administrative and user perspectives, a questionnaire with system users can be enacted to better understand the system user perspective, rather than the commonly studied management standpoint. Lastly, other management sectors of a firm can be studied to perceive if the user-management gaps in the ERP implementation.

REFERENCES

- Abdelmoniem, E. M. (2016). The critical success factors and the effect of ERP System implementation on business performance: Case study in Egyptian environment. *International Journal of Computer Science and Information Security*, 14(5), 104-115.
- Al-Mashari, M. (2003). Enterprise resource planning (ERP) systems: A research agenda. *Industrial Management and Data Systems*, 103(1), 22-27.
- Ali, M., & Miller, L. (2017). ERP system implementation in large enterprises – a systematic literature review. *Journal of Enterprise Information Management*.
- Bansal, V., & Agarwal, A. (2015). Enterprise resource planning: identifying relationships among critical success factors. *Business Process Management Journal*.
- Basoglu, N., Daim, T., & Kerimoglu, O. (2007). Organizational adoption of enterprise resource planning systems: A conceptual framework. *Journal of High Technology Management Research*, 18(1), 73-97.
- Baykasoğlu, A., & Gölcük, İ. (2017). Development of a two-phase structural model for evaluating ERP critical success factors along with a case study. *Computers & Industrial Engineering*, 106(1), 256-274.
- Beheshti, H. M., & Beheshti, C. M. (2010). Improving productivity and firm performance with enterprise resource planning, 4(4), 445-472.
- Blau, F. D., & Kahn, L. M. (2017). The gender wage gap: Extent, trends, and explanations. *Journal of Economic Literature*, 55(3), 789-865.
- Bradford, M., & Florin, J. (2003). Examining the role of innovation diffusion factors on the implementation success of enterprise resource planning systems. *International Journal of Accounting Information Systems*, 4(3), 205-225.
- Bradley, J. (2008). Management based critical success factors in the implementation of Enterprise Resource Planning systems. *International Journal of Accounting Information Systems*, 9(3), 175-200.
- Bryman, A., & Bell, E. (2018). *Business Research Methods* (3 ed.). Oxford.

Analyzing Factors for the Successful Implementation of Enterprise Resource Planning System in UAE Organizations

- Brown, S. C. (2010). Technology acceptance and organizational change: An integration of theory. *Dissertation Abstracts International Section A: Humanities and Social Sciences*.
- Caglio, A. (2003). Enterprise Resource Planning systems and accountants: Towards hybridization? *European Accounting Review*, 12(1), 123-153.
- Cameron, R. (2009). A sequential mixed model research design: Design, analytical and display issues. *International Journal of Multiple Research Approaches*, 3(2), 140-152.
- Candra, S. (2012). ERP implementation success and knowledge capability. *Procedia - Social and Behavioral Sciences*, 65, 141-149.
- Caserio, C., & Trucco, S. (2018). Enterprise resource planning systems. *Contributions to Management Science*. Retrieved from https://doi.org/10.1007/978-3-319-77679-8_2
- Certo, S. T., Busenbark, J. R., Woo, H. S., & Semadani, M. (2016). Sample selection bias and Heckman models in strategic management research. *Strategic Management Journal*, 37(13), 2639-2657.
- Chou, S. W., & Chang, Y. C. (2008). The implementation factors that influence the ERP (enterprise resource planning) benefits. *Decision Support Systems*, 46(1), 149-157.
- Chow, I. H. S. (2018). The mechanism underlying the empowering leadership-creativity relationship. *Leadership & Organization Development Journal*, 39(2), 202-217.
- Costa, C. J., Ferreira, E., Bento, F., & Aparicio, M. (2016). Enterprise resource planning adoption and satisfaction determinants. *Computers in Human Behavior*, 63, 659-671.
- Cresswell, John W. (2003). Qualitative, Quantitative, and Mixed Methods Approaches. *Research Design, Second Edition*. Retrieved from <https://doi.org/10.3109/08941939.2012.723954>
- Davenport, T. H. (2000). The future of enterprise system-enabled organizations. *Information Systems Frontiers*, 2(2), 163-180.
- Dechow, N., & Mouritsen, J. (2005). Enterprise resource planning systems, management control and the quest for integration. *Accounting, Organizations and Society*, 30(7-8), 691-733.
- Dey, P. K., Clegg, B. T., & Bennett, D. J. (2010). Managing enterprise resource planning projects. *Business Process Management Journal*.
- Dezdar, S., & Ainin, S. (2011). The influence of organizational factors on successful ERP implementation. *Management Decision*.
- Disney, D. (2018). Visual enterprise resource planning. *Corrugated Week 2018 - Driving Disruption: The Road to Success*.
- Elbardan, H., & Kholeif, A. O. (2017). ERP, internal auditing and corporate Governance. *Enterprise Resource Planning, Corporate Governance and Internal Auditing*, 12(5), 13-54.

- Fayaz, A., Kamal, Y., Amin, S., & Khan, S. (2017). Critical success factors in information technology projects. *Management Science Letters*, 7(2), 73-80.
- Feldman, G., Shah, H., Chapman, C., & Amini, A. (2016). Enterprise systems: the upgrade process model. *Journal of Enterprise Information Management*.
- Garg, P., & Garg, A. (2014). Factors influencing ERP implementation in retail sector: An empirical study from India. *Journal of Enterprise Information Management*.
- Giachetti, R. E. (2016). *Design of enterprise systems: Theory, architecture, and methods*. New York, NY: CRC Press.
- Gupta, A. (2000). Enterprise resource planning: The emerging organizational value systems. *Industrial Management and Data Systems*.
- Haddara, M., & Elragal, A. (2015). The Readiness of ERP Systems for the Factory of the Future. *Procedia Computer Science*, 64, 721-728.
- Hitt, L. M., Wu, D. J., & Zhou, X. (2002). Investment in enterprise resource planning: Business impact and productivity measures. *Journal of Management Information Systems*, 19(1), 71-98.
- Hoch, J. E., & Dulebohn, J. H. (2013). Shared leadership in enterprise resource planning and human resource management system implementation. *Human Resource Management Review*, 23(1), 114-125.
- Hossain, L., Patrick, J. D., & Rashid, M. a. (2002). Enterprise Resource Planning: Global Opportunities and Challenges. *Idea Group Publishing (Feb. 2002)*.
- Ifinedo, P. (2014). Information systems security policy compliance: An empirical study of the effects of socialization, influence, and cognition. *Information and Management*, 51(1), 69-79.
- Jaramillo, C., & Chen, M. (2016, Feb). *Grocery Retail Trends in the United Arab Emirates*. Retrieved Sep 29, 2018, from Agriculture and Agri food trend in Canada:
- Kasemsap, K. (2016). Multifaceted applications of data mining, business Intelligence, and knowledge management. *International Journal of Social and Organizational Dynamics in IT*, 5(1), 57-69.
- Kurbel, K. (2016). 5. ERP – Enterprise Resource Planning. *Enterprise Resource Planning und Supply Chain Management in der Industrie*. Retrieved from <https://doi.org/10.1515/9783110441697-006>
- Larteb, L., Benhadou, M., Haddout, A., & Nahla, H. (2016). The key to lean Performance: Implementing a daily shop-floor control system using Standardization and visual management. *Journal of Advanced Research in Management*, 7(1), 34-43.
- Light, B., Holland, C. P., & Wills, K. (2001). ERP and best of breed: A comparative analysis. *Business Process Management Journal*. Retrieved from <https://doi.org/10.1108/14637150110392683>
- Madanhire, I., & Mbohwa, C. (2016). Enterprise Resource Planning (ERP) in Improving Operational Efficiency: Case Study. *Procedia CIRP*, 40, 225-229.
- Marnewick, C., & Labuschagne, L. (2005). A conceptual model for enterprise resource planning (ERP).

Analyzing Factors for the Successful Implementation of Enterprise Resource Planning System in UAE Organizations

Information Management and Computer Security.

Maas, J. B., van Fenema, P. C., & Soeters, J. (2016). ERP as an organizational innovation: key users and cross-boundary knowledge management. *Journal of Knowledge Management*.

Matias, J. B., & Hernandez, A. A. (2019). Cloud computing adoption intention by MSMEs in the Philippines. *Global Business Review*, 0972150918818262.

Mittal, S. (2016). Effects of transformational leadership on turnover intentions in IT SMEs. *International Journal of Manpower*, 37(8), 1322-1346. doi:10.1108/IJM-10-2014-0202

Mitra, P., & Mishra, S. (2016). Behavioral aspects of ERP implementation: A conceptual review. *Interdisciplinary Journal of Information, Knowledge, and Management*, 11(1), 17-30.

Morris, M. G., & Venkatesh, V. (2010). Job characteristics and job satisfaction: understanding the role of enterprise resource planning system implementation. *MIS Quarterly: Management Information Systems*, 143-161.

Poston, R., & Grabski, S. (2001). Financial impacts of enterprise resource planning implementations. *International Journal of Accounting Information Systems*, 2(4), 271-294.

Prasad, D. S., Pradhan, R. P., Gaurav, K., Chatterjee, P. P., Kaur, I., Dash, S., & Nayak, S. (2018). Analyzing the Critical Success Factors for Implementation of Sustainable Supply Chain Management: An Indian case study. *Decision Science*, 45(1), 3-25. doi:10.1007/s40622-017-0171-7

Rao, S. S. (2000). Enterprise resource planning: business needs and technologies. *Industrial management & data systems*.

Reitsma, E., & Hilletofth, P. (2018). Critical success factors for ERP system implementation: A user perspective. *European Business Review*.

Saade, R. G., & Nijher, H. (2016). Critical success factors in enterprise resource planning implementation: A review of case studies. *Journal of Enterprise Information Management*. Retrieved from <https://doi.org/10.1108/JEIM-03-2014-0028>

Saide, & Mahendrawathi, E. R. (2015). Knowledge management support for enterprise resource planning implementation. *Procedia Computer Science*, 72, 613-621.

Sarker, S., & Lee, A. S. (2003). Using a case study to test the role of three key social enablers in ERP implementation. *Information and Management*, 40(8), 813-829.

Seethamraju, R. (2015). Adoption of software as a service (SaaS) enterprise resource planning (ERP) systems in small and medium sized enterprises (SMEs). *Information systems frontiers*, 17(3), 475-492.

Sarno, R., & Herdiyanti, A. (2010). A service portfolio for an Enterprise Resource Planning. *International Journal of Computer Science and Network Security*.

Saunders, M., Lewis, P., & Thornhill, A. (2016). *Research Methods for Business Students* (7 ed.). Pearson.

- Schuh, G. (2017). ERP Enterprise Resource Planning. In *CIRP Encyclopedia of Production Engineering*. Retrieved from https://doi.org/10.1007/978-3-642-35950-7_6673-3
- Shaul, L., & Tauber, D. (2013). Critical success factors in enterprise resource planning systems: Review of the last decade. *ACM Computing Surveys*, 45(4), 1-39.
- Shi, J. J., & Halpin, D. W. (2003). Enterprise resource planning for construction business management. *Journal of Construction Engineering and Management*, 129(2), 214-221.
- Somers, T. M., & Nelson, K. (2001). The impact of critical success factors across the stages of enterprise resource planning implementations. *Proceedings of the Hawaii International Conference on System Sciences*. Retrieved from <https://doi.org/10.1109/HICSS.2001.927129>
- Spathis, C., & Constantinides, S. (2003). The usefulness of ERP systems for effective management. *Industrial Management and Data Systems*.
- Stratman, J. K. (2007). Realizing benefits from enterprise resource planning: Does strategic focus matter? *Production and Operations Management*, 16(2), 203-216.
- Thakur, M. A. (2016). Enterprise resource planning (ERP) implementation in technical educational institutes: Prospects and challenges. *International Journal of Multifaceted and Multilingual Studies*, 3(2), 1-5.
- Thomson, J. D. (2011). An efficient, effective e-Government enterprise resource planning model. *Proceedings of the European Conference on E-Government, ECEG*.
- Tsai, W. H., Shaw, M. J., Fan, Y. W., Liu, J. Y., Lee, K. C., & Chen, H. C. (2011). An empirical investigation of the impacts of internal/external facilitators on the project success of ERP: A structural equation model. *Decision Support Systems*, 50(2), 480-490.
- Uçaktürk, A., & Villard, M. (2013). The effects of management information and ERP systems on strategic knowledge management and decision-making. *Procedia - Social and Behavioral Sciences*, 99, 1035-1043.
- Umble, E. J., Haft, R. R., & Umble, M. M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. *European Journal of Operational Research* 146(2), 241-257.
- Wu, Z., & Pagell, M. (2011). Balancing priorities: Decision-making in sustainable supply chain management. *Journal of Operations Management*, 29(6), 577-590.
- Zhang, L., Lee, M. K. O., Zhang, Z., & Banerjee, P. (2003). Critical success factors of enterprise resource planning systems implementation success in China. *Proceedings from the 36th Annual Hawaii International Conference on System Sciences, HICSS 2003*.
- Ziemba, E., Oblak, I., Zhao, J., Tang, Q., Xu, X., Liu, H.,...McLean, E. D. W. (2011). Importance and Impact of ERP Systems on Industry and Organization. *Journal of Management Information Systems*.