SAP Implementation: The impact of SAP (ERP) system in operations and total quality management of firms: A Case Study of Omani Companies

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Abstract

Enterprise Resource Planning (ERP) system facilitates the firms in tracking and managing information across all business functions and departments. ERP systems need huge investments of money, time, and resources. A successful implementation facilitates the firms in cutting costs and streamlining workflows. On the other hand, a poorly planned ERP rollout can have a huge negative impact on the organizations in terms of delays and lost productivity. SAP has attained a leading position in the world in the domain of enterprise applications. The offerings of the company include software as well as software-related services. SAP is regarded as the third largest manufacturer of software in the world based on market capitalization. This study aims to analyze the impact of SAP ERP implementation on operations and total quality management of firms. The researcher selected four Omani companies as case studies for the study. These include Hofincons Group, Petroleum Development Oman, SAP Middle East and North Africa, and Telecommunications Regulatory Authority. These companies are related to the sectors of asset management, oil & gas, software development, and telecommunications. The researcher intends to analyse the impact of the implementation of SAP on operations and total quality management of these companies and evaluate the firm's productivity and improvement due to the implementation. The findings of the study will be beneficial for the Omani companies that are pursuing to implement ERP systems in their corporate setup. Budget and limited time were major limitations in this research.

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CHAPTER 1: INTRODUCTION

Enterprise Resource Planning (ERP) system facilitates the firms in tracking and managing information across all business functions and departments. The term originated in U.S. in 1990 when major firms needed integration of their systems outsides of their manufacturing applications. They needed to share data of their applications with the systems such as financial accounting, supply chain, customer relationship, and other applications. ERP was introduced as an application package that could integrate all of these applications. The common features and modules found in ERP software include accounting, business intelligence, customer relationship management, human resources, inventory management, manufacturing, and supply chain management (Burnson, 2015).

The implementation of ERP project is resource consuming and challenging activity. It takes place in several phases. An initial phase in the ERP implementation process is the selection of vendor. The project, in most of the cases, is destined to fail, if a firm selects an inadequate ERP. Haddara (2014) presented a technique for the selection of ERP package. The technique is known as Simple Multi-Attribute Rating Technique (SMART). The first step in this technique is the development of process maps for all critical business processes of the organization. The next step is to identify the degree of compliance of the developed process maps with the potential ERP packages. The adequacy of the selection is ensured by matching the business requirements with the features available in the ERP package. It reduces the risk of project failures and acquiring a non-fitting ERP system.

SAP offers solutions for different lines of businesses. These include asset management, commerce, finance, human resources, manufacturing, marketing, R&D/engineering, sales, service, sourcing/procurement, supply chain, and sustainability. SAP offers foundation ERP

software for managing the business. It enables operational excellence and provides real-time insight for the business processes. The business data can be consolidated so that the duplication of efforts could be avoided. Firms can streamline their business processes with reliable, consistent, and real-time information. It enables the firms to quickly respond to the demands of the customers with fast, efficient, and flexible processes. The firm can get competitive advantage with improved results and financial insights. Organizations can activate and update their business functions on demand. The different Enterprise Resource Planning (ERP) solutions of SAP include Procure to Pay, Plan to Product, Order to Cash, Request to Service, Core Human Resources, and Core Finance. SAP also offers mobility for ERP, rapid deployment for ERP, and ERP solutions for small and midsize businesses (SAP, 2015b). Figure 1 shows different ERP solutions offered by SAP.

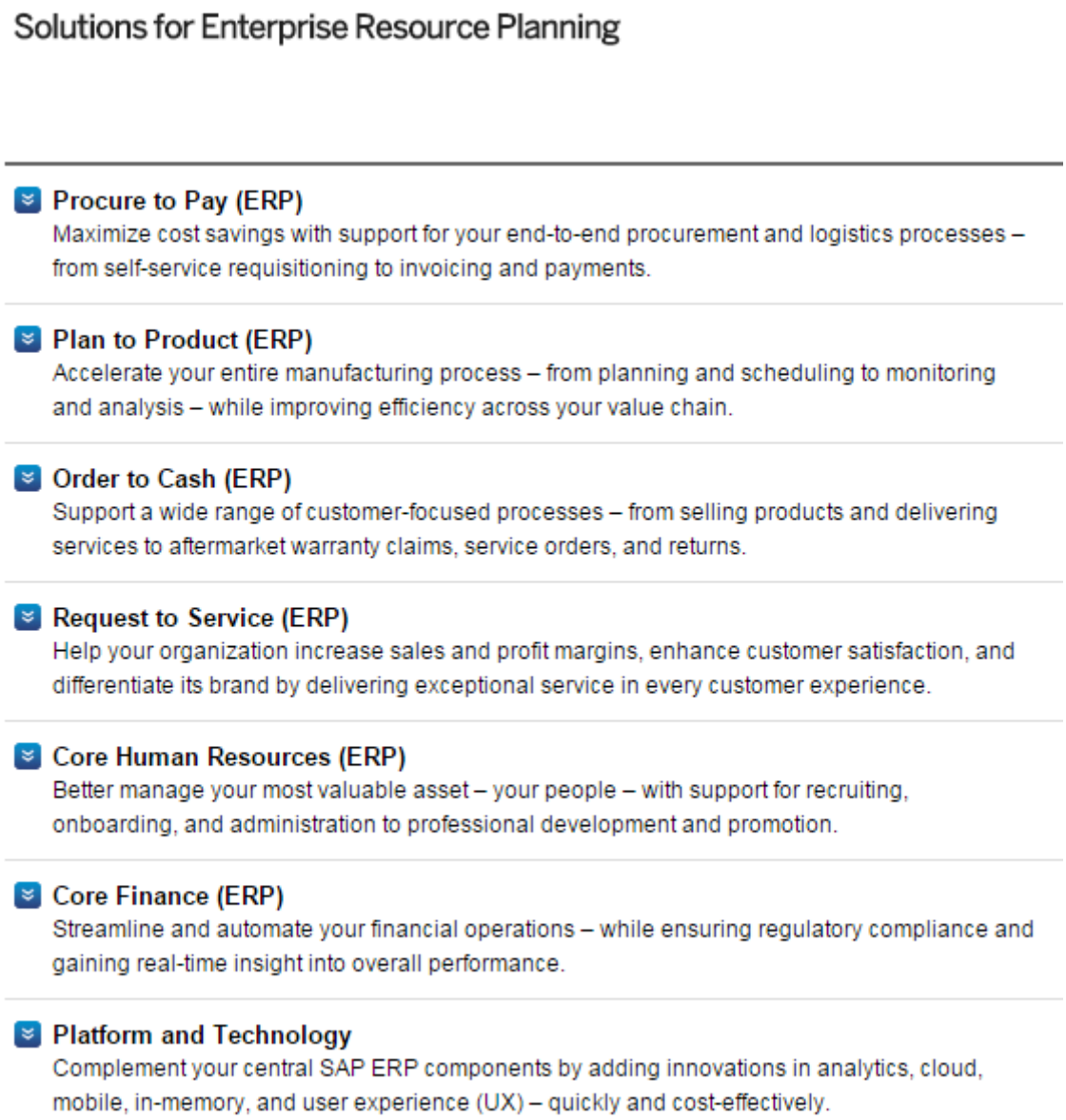

Figure 1: SAP ERP Solutions

Source: (SAP, 2015b)

This study aims to analyse the implementation of SAP on operations and total quality management of Government and Private Companies located in Oman and to evaluate the firm's productivity and improvement due to the implementation of SAP.

1.1 Background of Study

SAP has attained a leading position in the world in the domain of enterprise applications. The offerings of the company include software as well as software-related services. SAP is regarded as the third largest manufacturer of software in the world based on market capitalization. The customer base of the company is spread over 190 countries with more than 291,000 customers. The company has presence in more than 130 countries with an employee count of 74,500. The annual revenue of the company has reached 17.56 billion Euros. The company claims to be an innovative company, market leader in enterprise application software, top cloud vendor, and leading mobility vendor (SAP, 2015a).

Quality not only provides a value advantage to the firms over competitors but also makes it possible for the firms to charge higher price due to the differentiation factor. The strategy results in a sustainable competitive advantage. When organizations have a competition of providing quality services, they need to adopt an operational strategy that could ensure process improvement and implement quality control measures. Total Quality Management is a concept that focuses on the quality of services in its entirety with the aim of satisfying the needs and wants of the customers. The success of quality management efforts is dependent on how effectively various management subsystems have been integrated (Agus, 2011, p. 1651). ERP systems can prove to be an ideal solution to provide such integration.

The ability to gain knowledge on customers and markets can enhance the predisposition of firms to adapt to environmental changes. It can improve the competitive position of the firm, when the competitors are slower to adapt due to being poorly informed. This crucial factor has motivated the firms to develop strategies that employ information technology as a resource for the use and acquisition of information. Firms have realized that simple implementation of IT

strategy is not sufficient for achieving a better performance of the firm. IT can become an effective tool when it is used in combination with other firm practices and resources. Perez-Arostegui et al. (2014) analyzed the complementarity of IT and the practices of quality management. The findings showed a significant and positive relationship.

When a firm evaluates options for selecting an ERP vendor, it must determine what type of buyer it is. The buyers usually fall into three categories. These include ERP systems buyers, best-of-breed buyers, and small business buyers. ERP systems buyers need integration of application data across all departments and business units. In this case, the requirement is to implement everything in ERP and develop one integrated system for the whole organization. It reduces the technical challenge that might be faced in integrating legacy applications with new ERP packages for a few business functions. The complete ERP solutions are offered by SAP, Oracle, Epicor, Microsoft Dynamics, Infor, and others. Best-of-breed buyers do not require complete implementation of ERP systems in all business functions. They require a single module or a few modules such as HR system and CRM system. Small business buyers have a limited scope in terms of their operations and number of employees. Due to the higher cost of ERP systems, they need to think if they should opt for an ERP system or develop in-house applications. Technical challenges and high upfront costs have kept many small businesses away from the adoption of ERP systems. However, with the evolution of cloud computing, small businesses have found new and innovative ways to implement advanced technology at the enterprise level (Burnson, 2015).

Oman is an Arab country that is located in the Arabian Peninsula at the south-eastern coast. The neighbouring countries of Oman include United Arab Emirates, Saudi Arabia, Yemen, Pakistan, and Iran. The government system in Oman is an absolute monarchy. The leadership of

the country is self-appointed since 1970. The oil reserves of Oman are considered as modest and it ranks 25th at the global level. The country is classified as high-income economy. According to the Global Peace Index, Oman is the 59th most peaceful country of the world (The World Factbook, 2015).

The Arabian Gulf region is regarded as one of the fastest growing areas of the world. The region is a major producer and exporter of gas and oil. The region has a large proportion of expatriate workers. In the private sector in particular, almost 60 percent of the employees are expatriates. They are hired on short-term contracts that are renewed periodically. The main reason for the selection of expatriates is their skills. Oman, like other countries of the Gulf Region, is characterised by high uncertainty avoidance and high power distance. Power distance refers to the extent to which less powerful members of the society show acceptance to the unequal distribution of power. Uncertainty avoidance refers to the extent to which members of the society tolerate ambiguity and uncertainty in the society (Moideenkutty et al., 2011, pp. 240-241).

The researcher selected four companies as case studies for this study. The companies were selected from the sectors of asset management, oil & gas, software development, and telecommunications. The researcher selected large and famous organizations from these sectors. This selection enabled the researcher to formulate diversified and comprehensive findings related to the topic of the study. The firms included Hofincons Group, Petroleum Development Oman (PDO), SAP MENA, and Telecommunications Regulatory Authority, Oman.

Hofincons Group has specializations in the provision of services related to industrial asset management. The services cover asset management consulting, contracted maintenance & operations, IT embedded solutions, and asset management training. The group aims to provide

technology driven services related to enterprise asset management. Its vision is to adopt high-tech and innovative products for cost effective services of asset management. The group is headquartered in Oman. The group provides its services in Oman, UAE, Saudi Arabia, India, North America, and Europe. The industries catered by the group include fertilizers, process industry, power industry, petrochemical, gas, and oil industry. The companies of the group are ISO9001:2008 certified. The renowned clients and associates of the group include Shell, Petroleum Development Oman, BP, Saudi Aramco, Saudi Basic Industries Corporation, Mott MacDonald, Worley Parsons, Galfar, Bumi Armada Berhad, Sinopec Addax Petroleum, Tecnicas Reunidas, and Enerflex (Hofincons Group, 2015). Figure 2 shows the profile of the group.

Figure 2: Profile of Hofincons Group

Source: (Hofincons Group, 2015)

Petroleum Development Oman (PDO) is a highly recognized company related to production and exploration in Oman. More than 70 per cent of the crude oil production in Oman is carried out by PDO. All of the natural gas supply in Oman is supervised by PDO. The major partners in the company include the Government of Oman, Royal Dutch Shell, Total, and Partex. They have 60 per cent, 34 per cent, 4 per cent, and 2 per cent shares respectively. The company was founded in 1937. The first exploration by the company was made in 1962. The company exported the first oil consignment in 1967. PDO has around 6,000 producing wells, around 130 producing fields, a work force of 45,000 contractors, and 8,000 non-contractor staff. The

processing plants and gas fields are operated by PDO on behalf of the government of Oman. The company is headquartered in Muscat, Oman (Petroleum Development Oman, 2015).

PDO has a leading position in the domain of Enhanced Oil Recovery (EOR). The process of EOR facilitates the operators in extracting oil from reservoirs in the cases when there is a significant drop in pressure. It makes it difficult for the extraction process to bring oil to the surface. EOR facilitates in this respect for extracting the oil. It is estimated that EOR will contribute to one third of the oil production of PDO. The EOR venture was initiated by the company in 2010. The company is moving forward with new projects in EOR. These include Miscibil gas injection, thermal recovery, and using chemicals to boost oil production (Petroleum Development Oman, 2015).

SAP is considered as a market leader in enterprise application software. The abbreviation SAP stands for 'Systems, Applications, and Products in Data Processing'. SAP Middle East and North Africa (MENA) is the fastest growing market for SAP at a global level. SAP MENA was founded in 2007. Since its establishment, it has expanded its operations and now SAP has established ten offices in the region. The company has presence in 16 countries across the region including Oman. The office locations of SAP MENA include United Arab Emirates, Abu Dhabi, Riyadh, Jeddah, Al Khobar, Egypt, Oman, Qatar, Kuwait, and Dubai Training and Development Institute. The Oman office is located at Knowledge Oasis Muscat (SAP, 2015c). Figure 3 shows the profile of SAP MENA.

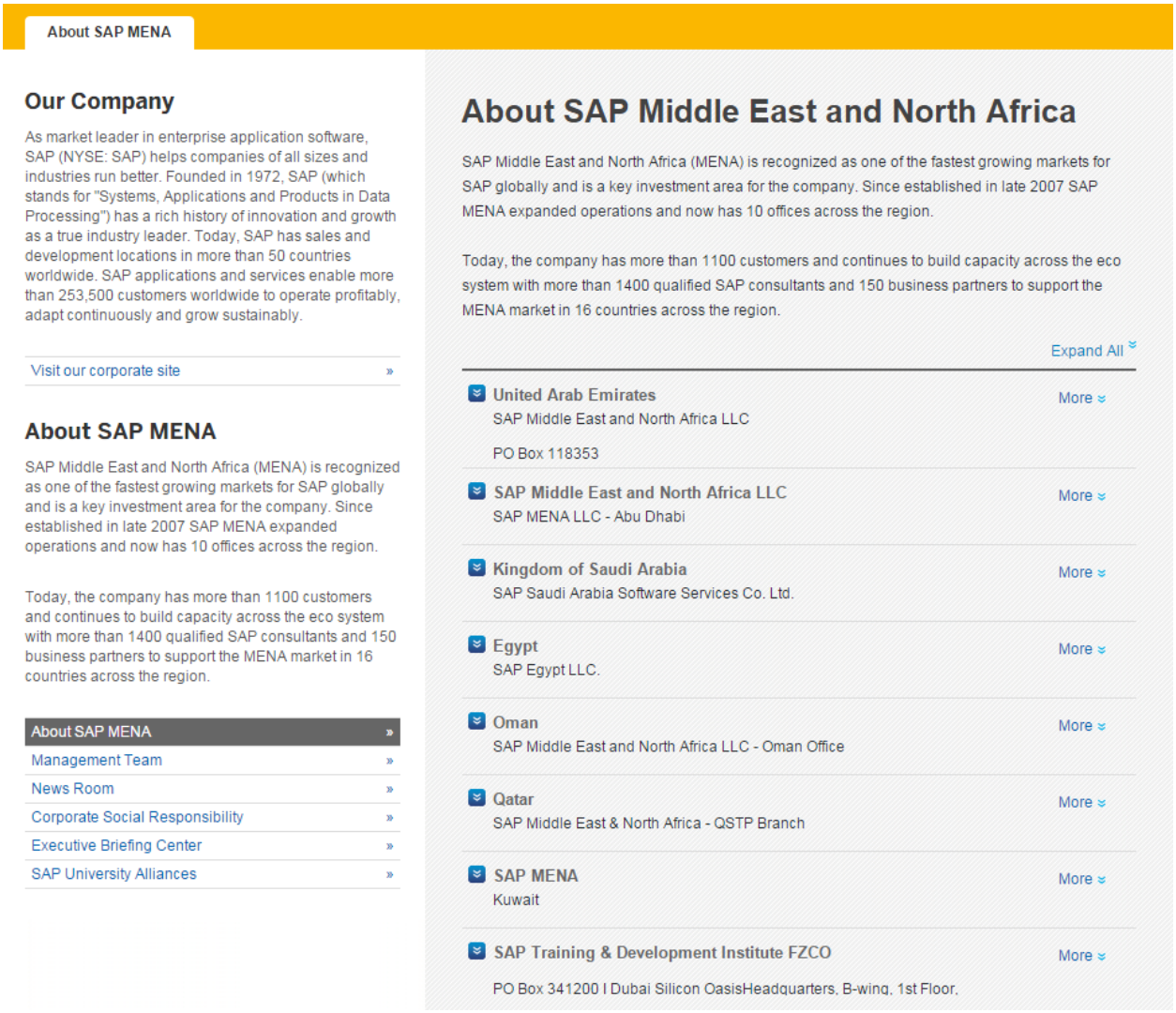

Figure 3: Profile of SAP MENA

Source: (SAP, 2015c)

The Telecommunications Regulatory Authority (TRA), Oman is mandated to implement the policies of Oman related to telecommunications. The authority was founded in 2002. It aims to promote and liberalize the services of telecommunications in Oman. The authority achieves this goal under the Telecommunications Act. The act was issued under the Royal Decree No. 30/2002. The authority aims to promote the growth of telecommunications sector. It ensures the

availability of advanced technologies through a range of delivery and choices to consumers with affordable prices. The authority also keeps a balance with the interests of all stakeholders in the sector based on principles of transparency, non-discrimination, and technology neutrality (Telecommunications Regulatory Authority, 2015).

The rules and regulations issued by the authority are aligned periodically with the emerging and evolving situations of the market. The authority focuses on enhancing the economic competitiveness by increasing the employment potential of local people. It provides an enabling environment for the development of knowledge society and the up-gradation of skills (Telecommunications Regulatory Authority, 2015). The three members in the authority include a Chairman and two full-time members. It is a corporate body that is mandated to regulate the market of telecommunications in Oman. The authority formulates regulations and policies that focus on increasing the investment of private sector and development of infrastructure (ITU, 2015).

SAP recommends ASAP methodology for the implementation of SAP solutions. According to SAP, it is a proven, replicable, and comprehensive methodology for streamlining projects and achieving implementation at a lower cost. The ASAP roadmap works by dividing the process of implementation in five phases. The methodology also recommends development of a detailed project plan that could assist in the process of implementation. The documentation of the process follows a roadmap tree structure and is stored at each level of the implementation. The documentation contains links to help accelerators/tools and recommendations on implementing the SAP system (SAP, 2015d).

When the SAP implementation assistant is installed, the user can choose from different types of roadmaps and flavours. The roadmap types include implementation, global ASAP, and

upgrade. In the implementation roadmap, the flavours include R/3 system, BW, APO, and business-to-business procurement. The five phases in the implementation of SAP include project preparation, business blueprint, realization, final preparation, and go live & support. In the project preparation phase, the project team makes the strategic decisions that are crucial for the success of the project. It defines the goals and objectives of the project. It defines the budget plan, project schedule, and implementation sequence. It also clarifies the scope of the project. The project team also establishes the project organization and other relevant committees. Resources are also assigned to these committees. In the business blueprint phase, a blueprint of the project is created by making use of the question and answer database. The database documents the requirements of the enterprise and identifies how the organizational structure and business processes should be mapped to the SAP system. In this phase, the original goals and objectives of the project are also refined. The overall project schedule is also revised in this phase (SAP, 2015d).

In the realization phase, the requirements of the business blueprint are configured. First, a baseline configuration is developed that covers the major scope. The baseline configuration is followed by final configuration that covers the remaining scope. The activity of developing final configuration may go up to four cycles. Integration tests are also conducted in this phase. The development of end user documentation is also initiated in this phase. In the final preparation phase, the preparations for the project are completed. The preparations include end user training, testing, cutover activities, and system management. All the open issues and queries are resolved in this phase. The project team ensures that all the preconditions for making the system live have been fulfilled. In the go live and support phase, the system is moved from the production environment to the live environment. The important activities in this phase include setting up

production support, optimizing system performance, and monitoring system transactions. When the system has been made live, the project team can utilize a separate roadmap that contains work packages, activities, and tasks (SAP, 2015d).

There are several market trends, related to ERP software, that are prevalent in the contemporary context. These include vendor consolidation, adoption of software as a service, mobile app development, and social media integration. In the vendor consolidation trend, large vendors are acquiring small ERP vendors to expand in new geographic markets. It is an important consideration from the buyer's point of view. If the provider gets acquired, the customer may not get the same support and updates. Hence, the evaluation process must take into account the strategic and financial viability of the vendor. Another important trend is the software as a service or web-based ERP. It is an attractive alternative to traditional systems that are installed on-premise. The benefits include lower initial investment, the familiar user interface, and quicker implementation. It also releases the burden from the companies to hire full time IT staff for the maintenance of hardware and server machines. Mobile app development is another important trend. Customers are now increasingly using smart phones to access corporate applications. Bring Your Own Device (BYOD) is gaining increased popularity across the world. Vendors have responded to the adoption of smart phones through the development of mobile interfaces for their ERP packages. Examples include mobile clients of SAP, Oracle, and Epicor. The fourth important market trend is social media integration. This trend is still in its infancy. ERP vendors are developing social media tools to make use of the social media in the corporate setup. These tools aim at fostering greater collaboration among employees. Organizations are also seeking integration between ERP programs and social networking sites such as Facebook and Twitter (Burnson, 2015).

ERP systems need huge investments of money, time, and resources. A successful implementation facilitates the firms in cutting costs and streamlining workflows. On the other hand, a poorly planned ERP rollout can have a huge negative impact on the organizations in terms of delays and lost productivity. Schiff (2012) describes 13 common mistakes in ERP implementation and the ways of fixing those mistakes. The first mistake is poor planning. Many organizations do not allocate sufficient time in the evaluation of ERP software. Organizations need to conduct an internal audit of all policies and processes before selecting an ERP system. The second mistake is usually done in improper vetting of ERP vendors. ERP vendors must be evaluated in terms of their success stories as well as the needs of the organizations and budgetary constraints. The third mistake is not gaining a comprehensive understanding of key features available in the ERP package. When the firms do not know the great features available in the ERP software, they miss the opportunity of automating their business processes.

The fourth mistake is the underestimation of the resources and time needed for ERP implementation. A scientific and task-based calculation needs to be done to estimate the time needed for achieving each milestone in ERP implementation. The fifth mistake is not assigning the right people for the task of ERP implementation. Organizations should assign those people in the project team who have been using the current systems for a long time and who are expected to be associated with the organization for an extended period of time. The sixth mistake is not prioritizing the tasks. Organizations should reduce multitasking so that a priority system could be set up for focusing on key and critical tasks at hand. The seventh mistake is not investing in change management and training. The features of ERP systems can be implemented and benefits realized only when the staff is aware of these features and knows how to use them. Hence, organizations need to invest in training of ERP packages. The training sessions can be arranged

in-house as well as on vendor's site.

The eighth mistake is underestimating the value of correct and accurate data. The IT Staff of the firms needs to put in place proper procedural and programming parameters to reduce the likelihood of entering incorrect data during the data migration process. The ninth mistake is expecting 100 per cent functionality in ERP package. No matter how comprehensive and expensive an ERP system is, it can never absorb all the business logic of the firms. The focus of the firms during the implementation should be on tracing costs and optimizing value chains. The tenth mistake is mapping the legacy applications to the ERP software. The goal of the ERP software is business process reengineering and making the firm adhere to the best practices in the world. When the organizations opt for the exact mapping of the legacy applications into the ERP system, they lose the very essence of ERP implementation.

The eleventh mistake is not having a proper environment for load testing. Organizations must be able to simulate the user load to analyze the real-world effects of changes. The twelfth mistake is ignoring the alternatives for third party support. Many companies select premium support for ERP maintenance. However, third party support at lower costs are also available that must be evaluated by the companies. The thirteenth mistake is not developing a maintenance strategy. Companies should focus on preventive maintenance to take full advantage of the ERP systems. If proper maintenance is not applied, business processes may become obsolete and the systems can also become obsolete from technical perspective (Schiff, 2012).

1.2 Research Aims and Objectives

The aims and objectives of this study are as follows:

- To analyse the impact of the implementation of SAP on operations and total quality

management of Government and Private companies located in Oman

- To evaluate the firm's productivity and improvement due to the implementation of SAP

1.3 Research Questions

Based on aims and objectives of the research, the researcher has formulated the following research questions:

1. How does implementation of SAP (ERP) software affect firms in Oman either in relationship to the productivity or profitability?
2. What change is observed by firms in Oman after implementation of SAP (ERP) solutions?

1.4 Significance of Research

This study aims to analyze the impact of SAP ERP system in operations and total quality management of firms. The researcher selected four Omani companies as case studies for the research. These include Hofincons Group, Petroleum Development Oman (PDO), SAP MENA, and Telecommunications Regulatory Authority (TRA), Oman. The selection of companies was made in such a way that it included asset management, oil & gas, information and communication technologies sector. The findings of the study will be beneficial for the Omani companies that are pursuing to implement ERP systems in their corporate setup. The benefits achieved from ERP implementation in these major companies of Oman will provide motivation to other companies to implement ERP systems. The issues and difficulties that were faced in the implementation in these firms will benefit other organizations to prevent the occurrence in their implementations.

1.5 Motivation for Research

ERP systems incorporate the latest features and best practices in their modules. The adoption of ERP systems provides an opportunity to the firms to reengineer their business processes and improve their workflows. Organizations across the world are opting for migration of their legacy applications to the ERP systems. The researcher is interested in analyzing how far the impact of ERP implementation has been realized in the context of Oman. The researcher focused the analysis in the areas of operations and total quality management. The analysis of the ERP implementation impact will not only highlight its importance but also motivate other organizations in Oman to opt for the implementation of ERP systems.

1.6 Limitation of Research

Although this research has been conducted carefully, the researcher is aware of the shortcoming or limitation of the research study. A major limitation for this research is budget. The amount of budget was limited for this research. Another major limitation for this research study was time. For an in-depth and thorough analysis related to the topic of this research study, greater time was required. Hence, limited time for the study constrained the researcher to assess greater number of variables.

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