EXTENDING IT INFRASTRUCTURES IN THE SERVICE SECTOR ORGANISATIONS THROUGH ENTERPRISE RESOURCE PLANNING – A TELECOM CASE STUDY

Khaled Al-Fawaz, Operations and Supply Chain Systems Group (OASIS)
Brunel Business School, Brunel University, UK
khaled.al-fawaz@brunel.ac.uk

Tillal Eldabi, Operations and Supply Chain Systems Group (OASIS)
Brunel Business School, Brunel University, UK
tillal.eldabi@brunel.ac.uk

Abstract

Service Sector Organisations (SSOs) have significantly focused on adopting and implementing Enterprise Resource Planning (ERP) systems to automate their prime business processes, enhance organisational productivity with lower costs and prompt service delivery to fulfil consumer demands. Thus, ERP systems are considered as a principal source to provide imperative information vital for strategic decision making process. On the contrary, ERP systems adoption and implementation is also highly considered as a challenging and expensive process that not only requires rigorous efforts but also demands to have an exhaustive investigation of influential factors that are critical to the adoption and implementation of ERP systems. As a result, the authors exhibit that it is of great significance to investigate this area within SSOs. In so doing, this paper thus focuses on the ERP critical success factors from five different categories such as: stakeholders; process; technology; organisation; and project based on the literature analysis. These perspectives comprise of 24 factors that are imperative for a successful ERP adoption and implementation. These factors are validated through an in-depth qualitative single case study based research. The findings from the literature and empirical demonstrate that most of the factors influencing the decision making process for ERP adoption and implementation are highly significant with exception to few that have either low or medium importance.

Keywords: ERP, SSOs, Adoption, Implementation, IT Infrastructure, Limitations

1   INTRODUCTION

Service Sector Organisations (SSOs) have long been considered as the prime engine of regional, nationwide or international economies, and therefore has acquired the most consideration from practitioners and academics including public and government organisations (Ozyilmaz and Berg, 2009; Uwizeyemungu and Raymond, 2011). However, it is highly acknowledged that a critical stipulation for SSOs is the need to determine capabilities to administer their portfolio of resources, including information technologies, as core services for business processes (Rai and Sambamurthy, 2006). The function of IT is, in particular significant, as these technologies have rapidly become one of the most important infrastructural elements of services sector organisations (Ozyilmaz and Berg, 2009). Essentially, some advocates have gone as far as to state that SSOs will also require to implement 'e-processes' in form or the other in order to survive in the current competitive marketplace (Tsikriktsis et al., 2004). Over the last few decades, IT has emerged as a strategic resource for SSOs and other business organisations, which have enabled them to enhance their

business processes, reform their operational activities and achieve varying degrees of success (Okunoye et al., 2007).

The latter argument is supported by Pilat and Devlin (2004), who state that SSOs are considered one of the most ardent users of information technology and different information systems. In doing so, offering direct support to customers in meeting their requirements, modernising their service delivery provision, optimise overall organisational operations and administering intricate service infrastructures that support diverse group of key individuals (Rai and Sambamurthy, 2006). The key point to note here is that SSOs' departments developed a number of IS for their individuals needs without keeping in mind the requirements of other departments and most importantly, the key stakeholders. This overall cluster of diverse IS with different operating systems, resulted in a non-integrated IT infrastructure (Ozyilmaz and Berg, 2009). This further resulted as a driving force for adopting and implementing integrated IS. SSOs have focused on a number of different IS in the past (Scott, 1999; Spohrer and Riecken, 2006). In analysing these IS, it was noted, although that IS provided some benefits in fulfilling the basic requirements of the organisations but primarily these ISs were not compatible with each other (Mulligan's 2002; De Búrca *et al.,* 2006). Having these in mind, SSOs are forced to look for better solutions that can overcome their existing IT infrastructure operational limitations (Seneler *et al.,* 2010).

Over the past few years, Enterprise Resource Planning (ERP) has significantly benefited the organisations and businesses in improving their business processes and infrastructure. These benefits include support in collective decision-making, lowered expenditures, security and privacy of employee's and customers' data, limiting the operational expenditures and adaptable and sustainable IT infrastructures (Boonstra, 2006; Doom et al., 2010). This integrated enterprise system has emerged to support organisations in delivering end-to-end and high quality services. Regardless of the fact that several organisations from the private and public sector have adopted and implemented ERP systems, its application specifically in SSOs in the context of Kingdom of Saudi Arabia (KSA) is limited. This may illustrate that SSOs lack adequate knowledge and expertise in making decision for adopting and implementing ERP systems as compared to other sectors. This lack of competence of ERP application in SSOs has resulted in limited research in this area with many issues, like its adoption and implementation requiring further investigation. For this reason, the authors intent to critically review the normative literature to explore influential factors influencing the decision making process for ERP adoption and implementation in SSOs.

The structure of the remaining paper is as follows: Section 2 highlights several IT infrastructure limitations within SSOs. These limitations provide an insight into how SSO resulted in developing non-integrated IT infrastructures, whereas, Section 3 highlights the need for improving SSO IT infrastructures by deploying integrated systems such as ERP systems. Section 4 begins by analysing ERP literature and explains the benefits realisation. Section 5 identifies the most imperative ERP critical success factors identified in the literature and prioritised in relation to five different perspectives. This creates clearer understanding of factors influential for successful ERP implementation. Section 5 presents the research methodology through which the influential ERP critical success factors are validated. In Section 6, the authors present the case study data from SSO_TELECOM. Finally, conclusions are drawn in Section 7.

2   IT   INFRASTRUCTURE   LIMITATIONS   IN   SERVICE   SECTOR ORGANISATIONS

Where SSOs have profusely adopted and implemented a number of technological solutions and benefited from them (Knock and Verville, 2006; Stare *et al.,* 2006); there are a plethora of IT project failures also reported (Khoumbati *et al.,* 2006; Ahmad *et al.,* 2007; Mantzana *et al.,* 2007). The latter two scenarios evidently highlight a lack of communal business-wide IT infrastructure within SSOs despite benefiting from their individual IT and IS solutions (Ozyilmaz and Berg, 2009; Uwizeyemungu and Raymond, 2011). The downside of the aforementioned assorted IT infrastructures in SSOs are scrutinised in detail in the literature, for example, excessive maintenance expenditures and customer data discrepancy and anomalies. SSOs including the healthcare and higher education institutions have also focused their attention towards prevailing over their technological dilemmas by connecting their different applications (Ahmad *et al.,* 2007; Khoumbati *et al.,* 2006; Mantzana *et al.,* 2007). This indicates that there is a need for integrating the existing disparate applications and or developing an integrated system that assists SSOs improving their operational activities (Ahmad *et al.,* 2007). Themistocleous et al., (2004) argues here that interconnecting heterogeneous applications or developing integrated systems is much more than anticipated. The core issue here is that SSOs adopted technological solutions that were not developed to interconnect with other existing applications (Khoumbati *et al.,* 2006; Ahmad *et al.,* 2007; Mantzana *et al.,* 2007). In this context, SSOs appear to have recognised that there a number of limitations in their technological infrastructure (as highly supported by Ahmad *et al.,* 2007) and that require appropriate approaches to enhance their effectiveness and offer improved services delivery.

Several academics have clarified that to gain the maximum benefits of using ICTs to enhance organisational business processes, organisations within the service sector are required to integrate and share their information (Bigdeli *et al.,* 2011). Other researchers accentuate that information sharing supports organisations to fulfil their customers' ever-changing requirements, engender solutions to acquire competitive edge in the marketplace, lead to enhanced customer contentment, and product and service quality and profitability (Dawes, 1996; Akbulut *et al.,* 2009). The latter arguments are supported by Barker (2008), who highlight that information sharing is most certainly one of the leading factors having an effect on organisational effectiveness, efficiency and performance. However, Bigdeli *et al.,* (2011) argue that there are a number of cases on information integration and sharing development projects have failed to deliver the anticipated benefits, as a large percentage of these failures are due to social and organisational factors, rather than just technical issues. A considerable problem that system developers are confronted with is that the organisational effects ensuing from the implementation of an information system are adverse and impulsive (Doherty and King, 2005). Given that, sophisticated and intricate IS can interrelate with the host organisation in diverse ways, it would be indeed by complicated to envisage all of their impacts (Gil-Garcia *et al.,* 2007; Bigdeli *et al.,* 2011).

Business Process Reengineering Issues: In today's global competitive environment, organisations are continually in pursuit of creative methods to subsist and outperform their competitors. Literature indicates that management approaches such as the business process re-engineering are widely adopted by a number of SSOs with the aim to accomplish tremendous and significant increase in performance and expenditure cutbacks. It is reported that business process re-engineering is the essential re-thinking and thorough revamp of business processes to accomplish enormous enhancements in vital modern measures of performance (e.g. cost, quality, service). However, the increasing focus on designing business around process has caused a significant paradigm shift in the way information systems are implemented and utilised to support business operations (Tapscott and Catson, 1993). Unless organisational IT infrastructures are not developed to match the scope of cross-functional chains of business processes, they would turn to be the greatest challenge in realising a truly process-oriented business. Al-Mashari (2001) highlight that as the perils involved and failure rates related with

business process re-engineering projects are excessive, it is vital to further explore the failure rationales utilising a methodical approach.

SSOs have designed and implemented a number of information systems to enhance their operations and service provision to customers (Tsikriktsis *et al.,* 2004; Okunoye *et al.,* 2007). However, one of the prime distinctive aspects of delivering services is the amount of customer contact as part of the whole service delivery system (Nie and Kellogg, 1999). It is observed that for a number of services, the presence of customer is vital for interacting or participating in the service delivery system. Safizadeh *et al.,* (2003) adds on to the latter argument that customer contact establishes reservations and disparities in the service delivery system and stresses for the need for changes in the overall design of the system – i.e. from front-office to the back-office. The combination of front-office and back-office operations can also be a practicable strategy. However, in the context of service system design in SSOs, Hill *et al.,* (2002) and Boyer and Lewis (2002) assert that for front-office and back-office operational issues there is a need for further attention. For example, there is a need for seamless and single point of contact for customers having in mind that their requirements keep changing (Voss, 2003). The latter is possible by structuring front-office and back-office operations in service delivery.

Organisations from any sector always intend and attempt to lessen their expenditures in order to enhance their financial capacity (Moohebat *et al.,* 2010). The latter argument is supported by Kalakota and Robinson (2001), who advocate that non-integrated IT infrastructures have recurrently resulted in organisations losing product sales, lower service quality and this enforces a negative effect on the organisation internally and externally. The SSOs, thus, need to focus on decreasing the expenditures of running and maintaining IT infrastructure that comprises of a heap of non-integrated systems and as a result, reduce the redundancy/ discrepancies of information and systems (Khoumbati *et al.,* 2006; Mantzana *et al.,* 2007). Researchers such as Light and Papazafeiropoulou (2004) claim that ERP systems are integrated systems that support in eradicating information redundancies and inconsistencies and enhance coordination among other systems in the infrastructure.

SSOs, as these are service providing organisations with different nature, management structures, technical infrastructure needs and operational activities (e.g. airline, telecom, healthcare, local government, education, etc) – all have a number of discrete business processes that necessitate discrete information transformations and process control formation. As a result, SSOs are required to overcome the abovementioned IT infrastructure limitations by inter-connecting different legacy and existing systems based in different departments such as human resource, finance and accounting, procurement, etc. In doing so, this will enhance the management's decision-making process. In the following section, the authors present the need for Enterprise Resource Planning systems that may assist the SSOs in prevailing over their existing IT infrastructure problems.

3 IT INFRASTRUCTURES IN SSOS - NEED FOR ENTERPRISE RESOURCE PLANNING SYSTEMS

As aforementioned, SSOs require an integrated IS solution to overcome their IT infrastructure limitations. The need for integration may be attributed to several SSO technological projects that were either never implemented or abandoned immediately after implementation and due to this many problems such as data integration or security interoperability that are technical in nature, remain most apparent at developmental and functional levels (Heeks, 1999). However, several other efforts have been made to overcome their technological limitations at various levels e.g. adopting and implementing system (e.g. see Siguaw *et al.,* 2000; Barnhart *et al.,* 2003; Beor and Mandal, 2000). The analysis of these systems highlight that they have their own sets of considerations and each of them differs from other since their design is not focused on analogous parameters. Although these information systems have provided significant benefits, they have not resulted in the development of an integrated IT infrastructure that efficiently automates SSO business processes and services. The

reasons may be that they were developed according to specific requirements and solving certain problems. It can be argued that projects developed for a specific area and solving particular problems may not comply with the integration needs in different areas.

Although the adopted and implemented information systems have not supported SSOs in achieving the level of integrated technological infrastructure needed, they have nonetheless contributed to better understand the limitations of SSOs IT infrastructures issues. Due to the IT infrastructure limitations reported earlier, SSOs are constrained and face difficulties to overcome their organisational and IT infrastructure limitations, quality of service provision, and enhance their performance and productivity. Literature also indicates that SSOs are increasingly challenged to respond more flexibly to issues confronting customers (Khoumbati *et al.,* 2006; Ahmad *et al.,* 2007; Mantzana *et al.,* 2007). As a result, the authors argue that there is a need for an enterprise wide integrated system that that attempts to meet SSOs' organisational requirements and infrastructure limitations. Evidently, the limitations discussed in the earlier sections; indicate the need for the adopting and implementing of enterprise resource planning systems in SSOs. To provide a philosophical understanding on ERP and its significance in SSOs, the following section briefly reviews the literature on ERP.

4   ENTERPRISE RESOURCE PLANNING SYSTEMS

ERP systems are highly considered as extensive, integrated software systems that support IT infrastructure, business process and other internal operations of an organisation (Doom *et al.,* 2010). These systems have become a sought-after tool for multi-purpose improvement of organisational functions, its processes and final performance. Rationale to adopt and implement ERP systems have primarily been the substantial benefits that the organisations aspire to acquire, or insubstantial viewpoint to fortify the organisation's business structure (Nguyen, 2009). There are several internal conditions within an organisation and along with its core and non-core resources that play an equivalent part as compared to the competitive forces of the business environment (Boonstra, 2006). ERP adoption and implementation is not merely confined to one department but is an organisation wide issue and can be perceived as a modernisation and automation project, strategic change, an organisational system, software, business process improvement technique, or an IT integration of the firm. These different aspects exemplify different perspectives of employing ERP systems within an organisational setup, such as: stakeholders, business processes, technology and IT infrastructure, organisation and project. ERP systems offer both types of benefits to organisations i.e. tangible (e.g. ERP systems can directly affect the bottom line of the business and from intangible perspective; ERP systems are less quantifiable and less measurable as an actual value [Poon and Yu, 2010]) and intangible (e.g. cycle time reduction, building cost leadership, operational control, reduced inventories, better data analysis, empowering employees [Abdelghaffar and Azim, 2010]).

The ERP benefits form the basis for taking decision for adoption (i.e. acceptance) or rejecting the huge investing in ERP systems infrastructure. On acceptance to invest in ERP systems, it is often observed that different organisations follow different approaches while adopting and implementing ERP systems' infrastructure. However, the prime challenge faced by many organisations is the fit of new ERP systems within their existing IT infrastructure. Differences between an organisation's processes and functions with ERP modules can be attributed to the compatibility issue. Here comes the factual trial of skills and expertise when the ERP team attempts to correlate and offer a practicable procedure between these two groups of business needs. It is simply comprehensible that right fit would make the implementation faster and easy with higher chances of success rate. This viewpoint is reverberated by many advocates and a manifestation for large organisations rolling out ERP for all subsidiaries (Boonstra, 2006). The implementation process is particularly complicated at this stage where all organisational functions are integrated into one central data system as per design requirements of ERP (Allen and Kern, 2001). This indicates that the implementation process is one of the most crucial stages in adopting and deriving benefits of ERP. Based on these reasons of adoption and

implementation, targeted results and other organisational issues, one can categorise different deployment strategies for each phase of implementation and factors influencing the implementation. For the reason aforementioned, there is need to investigate such factors that influence the decision making process for adopting and implementing ERP systems in SSOs.

4   FACTORS INFLUENCING THE DECISION-MAKING PROCESS FOR ERP ADOPTION AND IMPLEMENTATION IN SSOS

Understanding the factors in adopting and implementing ERP systems has been a challenging process for many organisations worldwide. In the context of this paper, the theoretical base has already been discussed and validated through an airline SSO in KSA in previous research by the authors (Al-Fawaz *et al.,* 2010). However, herein the authors merely highlight the importance of these factors entirely based on viewpoints, understanding and observation of other researchers in the literature. The importance of factors illustrated in Table 1 thus should not be considered as conclusive evidence as these rankings are extracted from different sources and cannot be generalised to one specific case. The actual validation of factors will be conducted through a telecom case study based research is presented in the subsequent section. Thereafter, a comparison will be conducted between the literature and empirical findings. Table 1 presents 24 factors extracted from the normative literature (specifically focusing on IS and ERP literature). The factors are categorised based on their relevance to a specific category. For example, Top Management Commitment and Project Champion are individuals that are also stakeholders of an organisation, thus, these and other similar factors are categorised accordingly. These factors have been arranged in order of their importance, where *H – High*; *M – Medium*; *L – Low*, in relation to each of the category.

ERP Factors Category	Critical Success Factors	Importance
Stakeholders	Top Management Commitment	**H**
	Project Champion	**H**
	Execution Team	**H**
	Qualified IT Staff	**H**
	External Advisory Support	**M**
	Vendor Partnership	**L**
	Total End-User Involvement	**L**
Process	Business Process Reengineering	**H**
	Customisation Approach	**M**
	Performance Measurement and Control	**L**
Technology	IT Infrastructure	**H**
	Package Requirements and Selection	**M**
	System Testing	**L**
	System Quality	**H**
	Information Quality	**H**
Organisation	Appropriate Business and IT Legacy Systems	**M**
	Change Management	**H**
	Effective Communication	**H**
	Business Vision Goals and Objectives	**H**
	Training and Education	**M**
	Organisational Structure and Culture	**L**
Project	Project Management	**H**
	Budget – Cost Parameters	**L**
	Time	**L**

Table 1: ERP Adoption and Implementation Factors *(Hypothetical Perspective from Literature)*

5   RESEARCH METHODOLOGY

The authors followed an interpretive, qualitative case study based approach to conduct this research and validate the adoption and implementation factors related to ERP as presented in Table 1. Researchers exemplify that interpretivism refers to the knowledge of realism that can be gained only through communal constructions such as awareness and perception, collective meanings, language, documents, tools and other artefacts (Saunders *et al.,* 2000). This indicates that an interpretivism viewpoint enables the researchers to steer through and better explain a specific observable fact. It is also expected that as the communal world cannot be condensed to secluded variables, such as space and mass, it must be observed in its entirety. Hence, the authors highlight that, there is a need for a research approach that may allow a specific organisation (in this context – an telecom company in the Kingdom of Saudi Arabia) to be viewed in their entirety and permits the authors to get close to participants (i.e. the interviewees), penetrate their realities, and interpret their perceptions. Hence, the authors consider interpretivism as more appropriate for the research reported herein. Having justified the use interpretive research approach, the authors describe the nature of qualitative research approach in order to justify its relevance to the research presented in this paper. Qualitative research is multi-method in focus, involving an interpretive, naturalistic approach to its subject matter (Denzin and Lincoln, 1994). This implies that the qualitative researchers study things in their natural environment, and they comprehend events in terms of meanings that people bring to them. The qualitative paradigm recommends that researchers observe human behaviour and action as it occurs in mundane everyday life (Schutz, 1967). Thus, the authors suggest that in the context of this research a qualitative approach is more appropriate as such approach can be used to: *(a)* examine the in-depth complexities and processes, *(c)* examine the phenomenon in its natural setting, (d) provide considerable flexibility during interviews and observations and *(c)* learn from practice. A case study examines a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities e.g. people, groups, or organisations (Yin, 2009).

In the context of this paper, a single case study was conducted at a Saudi Arabia Telecom company. Case studies enable the researchers to investigate a phenomenon in depth, getting close to the phenomenon, providing rich primary data and revealing its deep structure within the organisational context (Cavaye, 1996). In addition to the interviews, data was collected through several other sources like observation, minutes for meetings, consultancy reports, the official website of the individual case organisation and archival documentation based on a detailed questionnaire. Interviews are regarded as the main tool of qualitative research for data collection process. In this research, interviews constituted the main data source in the telecom case organisation. Ten participants from SSO_TELECOM were interviewed using structured interviews as shown in Table 2. Structured interviews were based on the interview agenda that lasted from 1½ to 2 hours each. Using the interview agenda, the interviewees replied to specific questions regarding ERP adoption and implementation. Semi-structured interviews with the same participants also took place but with a more flexible agenda and these interviews lasted one hour. With this type of interviews the participants attempted to further clarify some issues that derived from the structured interviews. All the structured and semi-structured interviews took place at interviewees' offices. Unstructured interviews (between 30 minutes to 1 hour) dealt with discussions that the authors had with interviewees but without using a structured or semi-structured type of interview. The unstructured interviews were carried out during lunches, coffee breaks and out of office hours. Using unstructured interviews some important data regarding the case studies were collected. All of the interviews were recorded and transcripts prepared as soon as possible after each individual interview. The recordings supported the collection of accurate data so as to interpret the data without time pressures. In the analysis of the case study, a pattern-matching logic was employed. This technique compares an empirically based pattern with a predicted one (Yin, 2009). Therefore, as we first formed the conceptual basis of this paper, this technique would be appropriate to compare the data from the literature (predicted ones) with the data gathered from the interviews (empirical ones). Prior to analysing the data, a summary of each interview transcription as well as a draft of each case study were sent back to the relevant interviewee in order to undertake a final review. The results and

analyses were also reviewed by the interviewees as a way of evaluating the accuracy of the empirical findings.

Interviewee Position	Type and Style of Conducting Interviews	Number of Meetings Conducted
Vice President - Information Technology (VP_IT)	All interviews were conducted in face to face manner with flexible process of discussion and answers.	1
Director General – Systems (D_GS)		3
Director - ERP Systems (D_ERPS)		4
Project Manager – ERP (PM_ERP)		1
IT Director - Human Resources Systems (DIT_HRS)		1
IT Director - Logistics Systems (DIT_LS)		2
IT Director - Financial Systems (DIT_FS)		1
Director - Human Resources Systems (D_HRS)		1
Director – Logistics Systems (D_LS)		2
Director – Finance Systems (D_FS)		1

Table 2: Interviewee Selection in SSO_TELECOM

6   CASE ORGANISATION – SSO_TELECOM

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6.1   BACKGROUND OF SSO_TELECOM IT INFRASTRUCTURE

Due to confidentiality reasons, the authors agreed to maintain the privacy of participants who acted as the interviewees and the organisation (in this case study). Henceforth, this case organisation that operates within the telecommunication and IT industry in KSA is one of the highly reputed organisations in the Middle East region, being one of the top ten companies launched by the government of KSA. This case organisation is termed as SSO_TELECOM hereafter. SSO_TELECOM is the largest telecommunication services provider in the Middle East and North Africa region and has presence in 10 other countries with headquarter in KSA. According its mission statement, SSO_TELECOM strives to exceed customer expectations in a world of constant change so that customers and company together can achieve business success and reach new horizons. Prior to 1998, SSO_TELECOM was wholly owned by government of KSA. In 1998, KSA government privatised 30% of the original company stock and listed it on Tadawul – KSA stock exchange in Riyadh. Before SSO_TELECOM's incorporation in 1998, KSA government started the activities to restructure the ownership holding, business divisions and IT systems of the organisation – indicating the evolution of ERP systems at SSO_TELECOM. Increasing competition worldwide, advancements in the telecommunication technologies and new licenses granted by government influenced the management at SSO_TELECOM to adopt and implement ERP solutions. Several other factors such as

operational efficiency, business process restructuring, and new business services development strongly emphasized the need of new technological system that can provide a single integrated platform. Their head of IT stated in his interview that:

"ERP (BSS - business support system as they call in case company) are very vital to the company business expansion in the country and outside to stay competitive and to retain the market share".

Accordingly, SSO_TELECOM finally adopted a challenging program aiming to transform its business from government system to the recognised commercial business standards. SSO_TELECOM has developed clear strategies focusing on internal re-organisation, re-skilling and development of its staff, enhancement of its internal processes and studying its customers' needs and requirements while continuing carrying out its national and social duties and responsibilities (Annual Report, 2009). Keeping in sight the importance of its customers, the SSO_TELECOM re-defined its strategic focus in terms of "FORWARD" strategy (i.e. *Fulfil* Personal Communication Potential, *Offer* Wholesale Services, *Re-invent* Home Communication, *Win* Enterprise Customers, *Achieve* External Growth, *Re-align* for Customer Excellence and *Derive* Operational Efficiencies) that aims to re-enforce its competitive positioning in the industry. Cascading of this strategy into the organisational culture with support from ERP for data, information, business intelligence and decision making, the SSO_TELECOM will be able to enhance the customer oriented business approach in the organisational design throughout its corporate centre, functional units and business units. This strategy enhanced and developed customers' experiences whilst helping SSO_TELECOM to secure international licenses and increase its operational competence.

6.2   ERP PROJECT PROCESS OF SSO_TELECOM

In line with the FORWARD strategy to derive operational efficiencies at SSO_TELECOM, their IT sector added the shared services concept to deliver and support IT services to their clients. In today's world of the changing complex business environment, the importance of IT is increasing. Hence, diligent management of IT environment is key to SSO_TELECOM's business needs. Moreover, open market policies by governments of many countries and technological innovations have developed the telecom industry into a complex and dynamic business environment where end-to-end planning has to be comprehensive and decision making within a short timeframe. This needs integration between various components of its business processes backed up by adequate resource allocations and organisational infrastructure to sustain the competitive position and business advantages. The engagement between information systems and strategic planning process becomes a crucial link in such a scenario. Also, there is lack of comprehensive view of IT as every section tries to receive help from IT department for various issues on the already installed modules. This increases downtime and costs of the business. This leads to further difficulties in budgeting, resource allocation, strategy planning and overall business transactions processing. Solutions to such a problem has been sought in designing and implementing ERP modules which requires the complete understanding of issues such as benefits, requirements and drivers of strategic information systems or new technology adoption. The presence of ERP creates the right environment for integrated strategic planning with attention it technology as a backbone in the system. To strengthen the business functions, decision making, governing information and mapping functionality to service, SSO_TELECOM started to avail services from Oracle modules in the business intelligence segment.

6.3 FACTORS INFLUENCING ERP ADOPTION AND IMPLEMENTATION – IDENTIFYING THE IMPORTANCE

The interviewees were asked to comment on the importance and the involvement of ERP adoption and implementation factors. Table 3 provides with the analysis of the factors using Miles and Huberman's (1994) scale of less important (○), medium important (◉) and most important (●) and where the interviewees did not respond, the researcher uses "×" symbol to illustrate as no response. The results depict that most of the factors have high importance while taking decisions for ERP adoption and implementation. The SSO_TELECOM managers were asked to rank each factor according to their importance according to their perspective of implementation.

	Factors Influencing ERP	INTERVIEWEES AND THEIR RESPONSES									
		VP_IT	D_GS	D_ERPS	PM_ERP	DIT_HRS	DIT_LS	DIT_FS	D_HRS	D_LS	D_FS
Stakeholders	Top Management Commitment	●	●	●	●	●	●	○	●	●	●
	Project Champion	●	●	●	◉	◉	◉	●	◉	○	◉
	Execution Team	●	◉	●	●	●	●	◉	●	●	●
	Qualified IT Staff	◉	●	●	●	●	●	◉	●	◉	●
	External Advisory Support	◉	◉	●	●	●	○	○	●	○	○
	Vendor Partnership	●	●	●	◉	◉	○	●	●	◉	◉
	Total End-User Involvement	●	●	●	●	●	●	●	●	○	●
Process	Business Process Reengineering	●	●	●	◉	●	●	●	●	●	●
	Customisation Approach	×	●	●	●	○	●	◉	◉	◉	◉
	Performance Measurement and Control	◉	●	●	●	●	○	◉	◉	◉	◉
Technology	IT Infrastructure	◉	●	●	●	◉	●	◉	◉	●	●
	Package Requirements and Selection	●	●	●	●	●	●	◉	◉	◉	●
	System Testing	●	◉	●	●	●	●	●	◉	●	◉
	System Quality	◉	●	●	●	●	●	●	○	◉	◉
	Information Quality	●	●	●	●	●	◉	●	○	●	●
Organisation	Business and IT Legacy Systems	○	○	●	◉	○	×	◉	○	●	◉
	Change Management	●	●	●	●	◉	●	●	◉	○	○
	Effective Communication	◉	●	●	●	●	◉	●	●	○	◉

	Business Vision Goals and Objectives	●	●	●	●	●	●	◉	◉	◉	◉
	Training and Education	◉	◉	●	●	●	●	●	●	◉	◉
	Organisational Structure and Culture	◉	●	●	◉	●	◉	●	◉	○	◉
Project	Project Management	●	●	●	●	●	●	◉	●	◉	●
	Budget – Cost Parameters	◉	●	●	●	●	●	●	◉	●	●
	Time	◉	●	●	●	◉	○	○	●	●	●

Table 3: Validation of Factors Influencing ERP Adoption and Implementation at SSO_TELECOM

The following Table 4 further presents an extended version of the above table. In this table where interviewees have not responded, authors have termed it as not applicable in the coding of responses. Each factor can receive maximum 10 times high, medium or low response as there were 10 interviews conducted within SSO_TELECOM. The average of the ranking is selected based on the following criteria. If the frequency of the rank received is equal or more than 6 times for that factor then that is considered as their average rank. In the rest of the cases which ranks are received more on the continuum of high to low is considered to decide the average rank of the factor. Where interviewees have not responded, it has been counted as not applicable. But, it has an effect on the average importance of the factor.

	Factors Influencing ERP	High	Medium	Low	N/A	Average of responses
		Frequency of H, M, L from 10 Responses				
Stakeholders	Top Management Commitment	9	0	1	–	H
	Project Champion	4	5	1	–	M
	Execution Team	8	2	0	–	H
	Qualified IT Staff	7	3	0	–	H
	External Advisory Support	4	2	4	–	M
	Vendor Partnership	5	4	1	–	M
	Total End-User Involvement	9	0	1	–	H
Process	Business Process Reengineering	9	1	0	–	H
	Customisation Approach	4	4	1	1	M
	Performance Measurement and Control	4	5	1	–	M
Technology	IT Infrastructure	6	4	0	–	H
	Package Requirements and Selection	7	3	0	–	H
	System Testing	7	3	0	–	H
	System Quality	6	3	1	–	H
	Information Quality	8	1	1	–	H

Organisation	Appropriate Business and IT Legacy Systems	2	3	4	1	L
	Change Management	6	2	2	–	H
	Effective Communication	6	3	1	–	H
	Business Vision Goals and Objectives	6	4	0	–	H
	Training And Education	6	4	0	–	H
	Organisational Structure and Culture	4	5	1	–	M
Project	Project Management	8	2	0	–	H
	Budget – Cost Parameters	8	2	0	–	H
	Time	6	2	2	–	H

Table 4: Analysis of Factors Influencing ERP Adoption and Implementation at SSO_TELECOM

The findings from the primary data and authors' interpretation show that most of the factors are considered having high importance in the ERP adoption and implementation. This confirms each factors influence in the decision making and equal importance of the different organisational perspectives which are fundamental to the existence of these factors. Authors' interpretation stands as validation check to findings as this is based on the experience, inferences from literature – secondary data of company and observations made in the field work. In comparing the importance identified from the literature and empirical findings, the authors assert that out of the 24 CSFs, results of 13 factors correlate with findings of the literature, whereas, 11 factors indicate different results as shown in Table 5. It can be deduced from these findings that majority of the factors presented accentuate higher importance in almost all sector organisations with more factors with higher importance in the case organisation presented herein. Nevertheless, the authors argue that the results generated should not considered final as they are based on a single case study. Thus, in increasing the number of cases and validating the set of factors presented, it will provide more harmonised results, allowing better analysis and decision-making for ERP adoption and implementation.

ERP Factors Category	Critical Success Factors	Literature Findings Importance	Empirical Findings Importance
Stakeholders	Top Management Commitment	H	**H**
	Project Champion	H	**M**
	Execution Team	H	**H**
	Qualified IT Staff	H	**H**
	External Advisory Support	M	**M**
	Vendor Partnership	L	**M**
	Total End-User Involvement	L	**H**
Process	Business Process Reengineering	H	**H**
	Customisation Approach	M	**M**
	Performance Measurement and Control	L	**M**

Technology	IT Infrastructure	H	**H**
	Package Requirements and Selection	M	**H**
	System Testing	L	**H**
	System Quality	H	**H**
	Information Quality	H	**H**
Organisation	Appropriate Business and IT Legacy Systems	M	**L**
	Change Management	H	**H**
	Effective Communication	H	**H**
	Business Vision Goals and Objectives	H	**H**
	Training and Education	M	**H**
	Organisational Structure and Culture	L	**M**
Project	Project Management	H	**H**
	Budget – Cost Parameters	L	**H**
	Time	L	**H**

Table 5: Comparing Literature and Empirical Findings

7   CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

Through the empirical findings presented earlier, the area of ERP adoption and implementation in SSO_TELECOM was studied by testing the factors. No claim for generalisation is made for interpretive research of this type. It is not the intention of this paper to offer prescriptive guidelines for ERP adoption and implementation in SSOs, but rather to describe case organisation perspectives that allow others to relate their experiences to those reported. The factors influencing ERP, which were identified through reviewing the literature and justified via the case study, are independent but interconnected. There are several IT infrastructure limitations in SSOs as highlighted earlier; these limitations impede SSOs in successfully providing seamless services to their customers. The authors in this paper attempt to highlight the significance of ERP systems in overcoming the existing IT infrastructure limitations in SSOs. In so doing, the authors presented a list of 24 factors and validating them in the context of SSO_TELECOM. On the other hand, these factors are found influential in the literature to a level where they can have positive or negative impacts on adoption and implementation of ERP. The criterion considered to select these factors are their necessity in adopting and implementing ERP apart from different business perspectives linked to them as an overarching organisational domain of selecting each of them. The authors propose an approach of filtering these factors based on five different categories (as highlighted in Table1). Major factors found are: business process design, package requirement and selection, change and project management. The most important factor included from every category in the literature is top management commitment. However, IT architecture, IT staff factors have not been identified in the literature but are of significance for the adoption and implementation of ERP, as clearly evident from the empirical findings.

Theoretical and practical implications of this paper include: literature assessment with altogether different viewpoint and synthesizing the influential factors for ERP adoption and implementation and validating these factors in an SSO context. Such implications offer further scope of applying results from this review to successful ERP adoption and implementation. It is expected from the practicing managers that concept and understanding of factors would help them to better decision-making in ERP

adoption and implementation from initiation to benefits realisation. There are also some intangible benefits that organisations may enjoy by implementing an ERP system e.g.: better customer satisfaction, improved vendor performance, increased flexibility, reduced quality costs, improved resource utility, improved information accuracy and improved decision-making capability. The result of this research cannot be generalised and should be developed further. These results may seem less as they are limited to a single case study in SSO_TELECOM, however, the authors consider that this will facilitate other researchers in this area to take this research as a starting point in comparing and better analysing ERP adoption and implementation factors whilst conducting and analysing more SSO case studies in different regions across the globe.

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