

Strategic Framework for Achieving Readiness in Organisations to Implement an ERP System

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ABSTRACT

Several taxonomies have been developed about ERP Critical Success Factors (CSFs) but there are few studies about readiness of organisations to accept an ERP system. This paper presents a strategic framework for companies to gain a proper level of readiness for implementing ERP systems. SMEs can make rational decisions about the best time for buying and implementing an ERP system if they understand their current readiness situation. For developing the framework, more than 100 key papers discussing ERP implementation in organisations have been collected and analysed. In this paper just some key papers are represented. Based on the results of analysing different viewpoints, 3 strategic issues and 10 strategies are proposed for gaining readiness for implementing ERP system, using the concept of strategic planning. Research findings of this study help decision makers of SMEs to attain a comprehensive picture about required actions to be accomplished for achieving readiness for implementing an ERP system.

Keywords

Enterprise resource planning, Readiness, strategic approach, literature review

INTRODUCTION

Companies in a competitive market must react quickly to their customers' requests if they want to remain in this environment (Aloini et al. 2007). To achieve this aim, they need to improve their procedures and speed up their supply. To do this, they need to use an integrated information system like the ERP system which is aligned to their business goals and processes (Al-Mashari et al. 2003; Aloini et al. 2007). Implementing an ERP system is not a simple implementation of computer software. It is complex software and needs careful planning to achieve a successful implementation (Aloini et al. 2007).

Implementing an ERP system in an organisation will create many challenges like organisational structure, financial planning and operations (Kwahk and Lee 2008). The challenges of the implementation phase may cause the failure of the project. Research about successful ERP implementation has shown that these kinds of project have high rate of failure (Abdinnour-Helm et al. 2003; Ash and Burn 2003; Razmi et al. 2009; Umble et al. 2003). These studies show the importance of determining a company's readiness for ERP implementation and carefully planning the actions necessary before starting the implementation phase of the project.

Because of the strategic nature of an ERP system and the potential challenges, top management needs a strategic framework which can guide them to achieve readiness before starting the implementation of the project. The primary purpose of this study is to provide a strategic framework to which demonstrates the required strategies to achieve readiness before project initiation. This framework is developed by reviewing the published research on organisational requirements for successful implementation of ERP systems. This research is in its early stages and at this point has consisted of the following:

- The results were analysed and the important factors have been extracted. Based on their nature, they have been classified into 10 groups.
- Based on this, a framework addressing strategic issues and actions for achieving readiness has been formulated.

CENTRAL CONCEPTS

As explained in the introduction, the aim of this research is to determine the critical factors which affect the readiness of organisations to implement an ERP system. The main concepts will now be defined.

Readiness for implementing ERP system; ERP systems have a high rate of failure in many types of company. So, reaching proper readiness to accept an ERP system is a necessity before project initiation (Razmi et al. 2009). The readiness of an organisation to implement an ERP system means existence of proper situation in all organisational, social and technical factors so as to avoid any barrier during the implementation phase.

Strategic framework; a strategic framework is a set of concepts which serve as the guiding principles in addressing a particular issue. The strategic framework for achieving readiness for implementing an ERP system is a set of guidelines for assessment of readiness and planning the necessary improvements in readiness. This framework should assess readiness all organisational levels (Aladwani 2001).

METHODOLOGY OF RESEARCH

The main goal of this research is to investigate recently published research to find the best strategies for achieving organisational readiness to implement an ERP system. Dezdard and Sulaiman (2009) recommend “content analysis” as an approach to analyse a large number of published papers. Cavana et al. (2001) described the steps of this approach.

- 1) Data collection; at this step the research scope is determined. We need to define the sample selection level (Berg 2004). Furthermore, the unit of analysis must be determined (Malhotra 2007). This unit could be sets of words, characters, themes or topics. In this research, many data bases and journals relating to business and information systems should be reviewed. The journals we reviewed included MIS Quarterly Executive, Journal of Operations Management, Technovation, Information Sciences, Journal of Information Technology, Information & Management, Communications of the ACM, European Journal of Operational Research, International Journal of Production Economics, Decision Support Systems, Computers in Industry, IEEE Software European Journal of Information Systems, and Industrial Management & Data Systems.

To review these journals, we needed keywords. We decided to choose keywords of a selection of published papers with a high number of citations (Akkermans and Van Helden 2002; Al-Mashari et al. 2003; Bradford and Florin 2003; Bradley 2008; Davenport 2000; King and Burgess 2006; Kwahk and Lee 2008; Motwani et al. 2005; Nah and Delgado 2006; Nah et al. 2001; Ngai et al. 2008; Parr and Shanks 2000; Razmi et al. 2009; Soh et al. 2000; Somers and Nelson 2004; Umble et al. 2003; Wang et al. 2007; Zhu et al. 2010). These keywords were combined with keywords relating to pre-implementation phase of an ERP system and the readiness of an organisation to implement an ERP system. The keywords that were used to search journal papers are listed in Table 1. Each keyword can be used differently in different papers. So, it was decided to consider alternatives for each main keyword. According to the considered keywords, 110 papers were downloaded and reviewed and 85 of them were chosen as related papers.

Main keyword	First alternative	Second alternative	Third alternative
Enterprise resource planning	ERP	ERP success	Implementation risks
Critical success factor	CSF	Readiness aspect	ERP failure
Pre-implementation	Readiness influential factors	ERP adoption	Enterprise system requirements
Readiness to implement	Readiness strategy	ERP implementation difficulties	ERP adaptation

Table 1. Keyword used for research

- 2) Open coding; this is the first step after determining the databases and analysing units. At this step, the scholar tries to find themes from initial raw data and label and categorize them on the basis of devoted labels (Dezdar and Sulaiman 2009; Neuman 1997). During the coding process it should be decided that whether a new theme should be coded with the pre-determined set of codes or whether a new code should be generated. All the chosen papers were reviewed in detail and the factors which influence organisational readiness to implement an ERP system were extracted.
- 3) Axial coding; In this step, after categorizing themes, the scholar investigates them again and determines the central axis of each category (Dezdar and Sulaiman 2009; Neuman 1997). During this step, the researcher decides about whether the particular theme should be remain as it has been coded or should be changed or merged with other themes.

So, the extracted factors were investigated again and their definitions were reviewed. This step showed that some factors were high level and can be considered as super factors, and others can be categorized as sub-factors. Super factors can be broken down to sub-factors. At the end of this step, we had around 65 influential factors.

- 4) Selective coding; In this step, the scholar investigates the themes and looks for the causes behind each of them. After that, a comparison between themes and subthemes should be done, and relations between identified categories should be determined.

In the last step of content analyzing, the identified factors were reviewed and categorized into 10 groups based on their definitions and similarities. Finally these 10 groups were named and they were treated as 10 strategies to increase readiness of an organisation to implement an ERP system.

As a final step, three readiness major categories were determined by using two former steps of content analysis methodology. The 10 strategies were then separated into these three categories based on their definition and similarity.

STRATEGIES (CRITICAL FACTORS) FOR ACHIEVING READINESS

As described earlier, selective coding was applied to the list of identified critical factors and they were categorized. In this research, each category is called a readiness strategy. Two criteria were utilized (Dezdar and Sulaiman 2009) to separate the critical factors into categories:

- 1) Internal homogeneity; this criteria means that to what extent critical factors in one category relate together in a meaningful way.
- 2) External heterogeneity; this criteria means that categories should have a bold and clear difference

Based on these two criteria, all identified factors were reviewed again. To prevent any mistake during the categorizing process, some of the main articles were reviewed again to find more detail about factors. During this step, factors with similar or the same meaning were categorized in one strategy. This classifying method was applied to all 65 identified factors and they were classified into ten categories which we called strategies.

The reason of calling these categories as strategy is that a strategy achieves advantage for the organisation through its configuration of resources within a challenging environment, to meet the needs of markets and to fulfill stakeholder expectation (Johnson et al. 2006; Jones et al. 2006).

Strategic Readiness

Implementing an ERP system is expensive and time consuming (Ngai et al. 2008). So, top management support (Law and Ngai 2007) and a proper leadership style (Dezdar and Sulaiman 2009) are two essential.

Furthermore, many scholars believe that determining a project champion is important. The champion should be chosen from a high level within the organisation (Reimers 2003; Somers and Nelson 2004). This person should support and promote the innovation and provide information, material resources, and political support for implementing this software.

Finally, other factors that were categorized in this group are:

- The existence of a CIO at a high level of the organisation.
- Top management affirmative view point for implementing ERP system.
- An active steering committee to decide about the project.
- Good alignment between business strategies and It strategies.
- Sufficient resources for the project.
- Defined tangible and intangible improvements result from the ERP implementation.
- Defined performance and success metrics,.
- Defined objectives which will be covered by implementing the ERP system.
- Defined opportunities that results from ERP implementation.
- Justified and clarified project cost.
- General consensus on objectives of ERP implementation.
- A well-articulated business vision to support the project.

Structural Readiness

The next important factor for ERP readiness is structural readiness (Bradley 2008). Several studies have shown that during the process of implementing any information system like an ERP system a flat organisational structure is better than a hierarchical and centralized structure (Ocker and Mudambi 2003). So the organisational structure should be modified before project initiation. Furthermore, most of the time, modifying the organisational structure forces organisations to re-engineer

their business processes (Bradley 2008; Nah et al. 2001; Somers and Nelson 2004). Therefore, running a BPR project before starting the ERP implementation of ERP is a necessary issue. Other factors that have been included in the structural readiness group are

- Defined organisational functional requirements.
- Documented business processes and roles.
- Predicted duties that will be changed after the ERP implementation.
- Identified key processes which influence success achievement.
- Organisational experience in implementation of similar scale IT projects.
- IT business process integration.

Organisational Readiness for Doing the Required Planning

Thorough and detailed planning is one of the most important prerequisites for undertaking any kind of project (Parr and Shanks 2000; Razmi et al. 2009; Umble et al. 2003). Ockerand Mudambi (2003) recommended that planning should be done on the three domains: corporate domain, the business unit domain and the information technology domain. Planning in the domain of information technology will define the needs of an organisation in the various sub-domains of IT such as infrastructure and staff knowledge about information technology. The most important factor in this domain is that planning should be integrated and coordinated. Several other factors have been proposed in literature for the planning domain. The organisation will reach proper planning readiness if it concentrates on issues such as project scope, use of external consultants to provide the project plan, appoint a capable project manager, estimate the project cost and required resources and investment, benchmark the ERP implementation process of competitors, document the method of managing stakeholders expectations, have a defined project management method and project team structure, predict various possible scenarios, document a risk management plan, achieve clarified and fixed business goals, achieve the required customization in business processes, and achieve adequate project management skills.

Cultural Readiness

Many scholars have decided that cultural readiness is one of the most important domains of readiness (Motwani et al. 2005; Wu et al. 2008). Ocker and Mudambi (2003) divided cultural readiness into two parts: (1) a cultural perspective to this kind of information system and (2) the staff's positive attitude toward change and sharing information among themselves.

Additionally, many studies have shown the importance of organisational values, assumptions, and collaborative and trust-based interaction (Bradley 2008). Employees must be empowered and have a positive attitude towards new technology and knowledge sharing. Other factors that have been categorized in this strategy are

- Employees and top manager's awareness about the project complexity and the ERP system ease of use,.
- Top management underline the ERP system implementation necessity during their communications,.
- Determine legacy systems deficiencies,.
- Defining business requirements to implement the ERP system.
- Predicting the changes which will occur after implementation.
- A documented plan to train employees.

Achieving the proper User Intention for Interacting with ERP System

Many scholars, who have concentrated on the social aspect of readiness, have decided that the interaction of users with the system is very important (Kwahk and Lee 2008). Other studies have shown that employees' former experiences in information technology are important (Bradley 2008). So, if an organisation increases the employees' intentions to leave legacy systems and use the ERP system, the possibility of successful ERP system implementation will increase. Other important factors are:

- Obtain user support.
- Inform employees about business process improvement resulting from the ERP implementation,.
- Employees' self-efficacy to work with computer.
- A sense of ownership about the ERP system among employees.
- Involve employees in mapping organisational process.
- Train the employees in the use of the ERP system.

Achieving an Efficient Level of Communication Inside the Organisation

ERP systems usually involve all departments and business units in the organisation. There must be good cooperation between departments (Al-Mashari et al. 2003; Law and Ngai 2007; Nah et al. 2001).

As well as the need for good inter-department communication, it is also important that the executive team of the project should communicate with all staff who will be influenced by implementing this system (Botta-Genoulaz and Millet 2006; Reimers 2003). Many staff in the organisation will be the end users of the system or will interact with the system. The executive team of project must communicate with these people effectively and train them to use the system. So, all factors related to organisational internal communications can be categorized in this strategy. Other related factors are proper communication between team of project and external consultants, regular communications between project manager and staff, existence of teamwork spirit among staff, and IT infrastructures to support interdepartmental communication.

Choosing Proper Application for Implementation

ERP systems are usually bought from vendors. It is very important for an organisation to choose an ERP system from a suitable and reliable vendor (Bradley 2008; Nah et al. 2001). Research in this domain has shown that organisations must consider several factors in choosing an ERP system. These factors include: the scope of project, the complexity of project, and the amount of required customization in application (Ocker and Mudambi 2003).

One of the most important points in choosing an ERP system is to define the scope of project. This means that the organisation must define the number of business units or functional processes which will be involved in the project (Mabert et al. 2003). Larger organisations will require more complex systems. A more complex system requires a higher level of knowledge by staff.

Companies also have to consider the required amount of customization of the chosen ERP systems and how much the vendor will change the system and how much the organisation should customize itself to suit this system (Nah et al. 2001). A high level of customization will lower the possibility success.

Achieving Proper IT Capability in Organisation

It is generally accepted that organisations need capability in the domain of information systems when they intend to implement an ERP system. For instance, the organisation should have capability in project management and have a skilled team (Dezdar and Sulaiman 2009).

Another important factor is an organisation's ability in project management of an organisation (Kraemmerand et al. 2003; Mabert et al. 2003; Reimers 2003; Somers and Nelson 2004; Sun et al. 2005). The project manager or the project team should have enough knowledge in project management to plan and lead an ERP implementation project. The executive team of the project must have enough knowledge to facilitate the process of implementation and solve the problems which may occur during the project. They must have the social skills to solve the social problems of interacting with employees and the technical knowledge to solve the technical problems (Kraemmerand et al. 2003). All factors related to the organisations capabilities can be categorized in this strategy. Other factors are business system thinking, explicit knowledge in the organisation about ERP systems, top management knowledge about IT and ERP systems, employ ERP professionals, and existence of adequate human resources in different domains of information technology such as infrastructure, web applications, relational database management, and servers management.

Providing Proper IT Infrastructure in Organisation

Like any other kind of IT application, an ERP system needs IT infrastructure for successful implementation. IT infrastructure is divided into the three domains of hardware, software and networking (Davenport 2000; Hakim and Hakim 2010). All factors related to these three domains were categorized in this strategy. Classified factors are suitable and reliable hardware and networking equipment; staff must have the required applications installed on their personal computers, use the internet data center for data storing, centralized structure of IT equipment, documented plan about staff access to information systems, and documented service level agreements to deal with IT service providers.

Managing Organisation Information Properly

The most important input of an information system is the data which is entered by users of the system. Data must be correct and precise. In many cases the data must be converted to a form suitable for the ERP system (Somers and Nelson 2004). Research has shown that the executive team of the project should treat data accuracy and quality as a major issue (Sun et al. 2005). Other related factors in this strategy are documented database conversion instruction, documented data migrant type,

organisation data in legacy system, documented policies about data configuration, security and encryption, and existence of in progress legacy IS with reasonable functional performance.

ORGANISATION STRATEGIC ISSUES FOR ACHIEVING READINESS FOR ERP IMPLEMENTATION

The critical issues for achieving proper level of readiness to implement an ERP system are called strategic issues because they are critical challenges which an organisation must overcome. Saleh and Alshawi (2005) in their research mentioned four aspects which should be considered when an organisation wants to assess its readiness for implementing an information system. These include: IT infrastructure, processes, people, and work environment. Schniederjans and Yadav (2013) in their studies about organisation readiness for implementing ERP systems proposed three domains: technology, organisation and environment.

We found 12 models of critical issues. By using the selective coding method, these models were reviewed again and finally three main strategic issues were selected. These issues are:

- *Organisational readiness*; this dimension is concerned with an organisation’s strategies, structures and processes.
- *Organisational social readiness*; this issue considers the readiness of an organisation’s staff. The issues include cultural readiness and the level of communication among the employees.
- *Organisational technical readiness*; this dimension is concerned with the technological readiness of an organisation and its’ technical abilities and knowledge.

PROPOSED FRAMEWORK

In earlier sections of this paper, 3 strategic issues and 10 strategies which influence organisations’ readiness for implementing ERP systems were elaborated. The three important strategic issues are strategic readiness, structural readiness, and project management capability. Other issues are social issues and internal communication and interaction with the ERP system. Other important issues are cultural readiness, achieving the right user intention for interacting with ERP system, and achieving a decent level of communication inside the organisation. Finally, it was noted that the strategic issue of technical readiness is important. Table 2 summarizes this classification.

Each of the strategic issues covers one aspect of the organisation. Organisations must focus on all of these factors simultaneously. In other word, each of these 10 areas is a factor in achieving readiness and none of them will be sufficient separately. All of these factors have interrelations between each other. Figure 3 is a graphical model of this framework. As can be seen, the framework has two separate layers but the components of each layer are located on a circle which represents the internal relations among components.

Strategic issue	Strategies (Critical factors)
Organizational readiness	Organisation strategically readiness
	Organisation structural readiness
	Organisational readiness for doing required planning
Social readiness	Organisation cultural readiness
	Achieving right user intention for interacting with ERP system
	Achieving decent level of communication inside the organisation
Technical readiness	Choosing proper application for implementation
	Achieving proper IT capability in organisation
	Providing proper IT infrastructure in organisation
	Managing organisation information properly

Table 2. Strategic issues and strategies to reach readiness

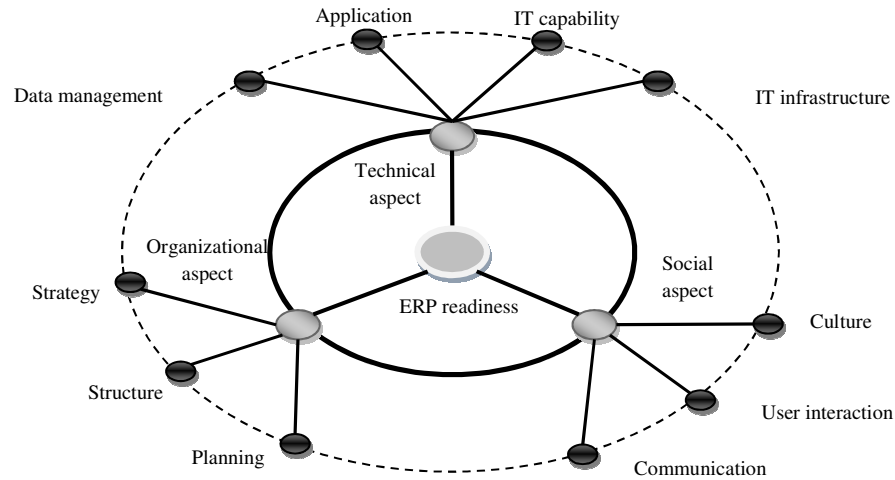


Figure 3: ERP readiness strategic framework

CONCLUSION AND CONTRIBUTION

This paper has presented a framework for achieving organisational readiness for implementing an ERP system. This framework gives a general picture to companies' decision makers about their readiness to implement an ERP system.

At first, the importance of an organisation's readiness for implementing ERP system was explained. It was explained that an ERP project is a strategic project and influences all parts of organisation. Consequently, companies should be ready before initiating it.

It was also explained that companies should have a strategic plan to implement this software. So, a strategic framework has been developed to guide the organisation top management to achieve proper level of readiness. This formwork consists of three strategic issues and 10 strategies.

A future aim of this research is to answer the questions: "what is the current organisation's capability for using an ERP system?" and "what actions must be in place before launching an ERP implementation project?". The answers to these questions are the main aim of this research.

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