Assessing Organizational Readiness for Implementing ERP System Using Fuzzy Expert System Approach

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ABSTRACT

Efficient use of enterprise resource planning systems is the only way to achieve competitive advantage in many industries. However, many reports indicate high failure rate of ERP implementation projects and the lack of access to benefits and advantages that enterprises have expected from ERP deployment. Managers are concerned about being ready to deploy such a system. Despite its enormous cost, implementing enterprise resource planning systems fail in practice. Accordingly, this study aims at providing a model for assessing the readiness of organizations for the implementation of ERP by using fuzzy expert systems. The model is composed of six fuzzy expert systems which are designed at two levels. The first five levels are the factors affecting the readiness of a system to produce the scores for an output. These outputs have been used as input to the final system for assessing the organization's readiness to implement the ERP system. In the design of each fuzzy expert system, fuzzy triangular membership functions were applied that had been selected for increasing the efficiency and ease of use. The Results of the model and its use in Shahid Ghazi Pharmaceutical Company show the status of readiness of the proposed model for ERP implementation. Moreover, the model shows the status of the organizations with regard to each of the factors affecting the implementation of the ERP system.

KEYWORDS

Enterprise Resource Planning, Fuzzy Expert System, Implementation of an ERP System, Readiness of the Organization

INTRODUCTION

Organizations always are faced with the need to change their structures, objectives, processes, and technologies. Thus, they must be able to make changes to sustain their competitive advantage. Many organizations have adopted ERP systems to achieve this (Kwahk & Lee, 2008, 474). Enterprise Resource Planning (ERP) is identified as the essential platform upon which companies are building their competitive business process upgrades (Ahmad & Cuenca, 2013, 104). According to Sun et

al. (2005), the efficient use of enterprise resource planning systems is the only way to achieve a competitive advantage in small industries.

Over the past decade, enterprise resource planning (ERP) systems have been implemented in many organizations worldwide (Tsai et al., 2011, 480; Ifinedo, 2006). "Studies have reported that ERP adoption is about 80% of Fortune 500 companies" (Kwahk & Lee, 2008, 474). "However, despite its popularity, ERP implementations have been plagued with high failure rates and inability to realize the promised benefits. The failure rate has been estimated as 60–90%. Some prior studies indicate that a primary failure reason was the resistance of users to change" (Lapointe & Rivard, 2005, 461). According to Hitt et al. (2002), ERP implementation is a challenging and risky task. According to Tsai et al. (2011), Ke & Wei (2008), Willcocks & Sykes (2000), various obstacles must be overcome in the process of successful implementation of an ERP system by an organization. In the meanwhile, various studies have been conducted to identify the critical success factors (Ehie & Madsen, 2005; Law & Nagi, 2007; Ahmad & Cuenca, 2013; Ram et al, 2013; Motwani et al, 2005), failure factors (Amid et al, 2012) and the role of change in ERP implementation. In all these studies, the researchers have focused on identifying the variables that affect the implementation of resource planning. In other words, even those studies which have attempted to assess organization readiness in practice, have failed to indicate the willingness of organizations to adopt and implement enterprise resource planning systems in their studies. It seems that the studies have not been able to come to the operational conclusion to convince senior managers of the organization to decide upon ERP implementation.

Managers of organizations are concerned about being prepared to establish such a system. Despite its high costs, the project of ERP system implementation failed in practice. The complex nature of the enterprise resource planning system and making changes in the working culture of the organization causes the initial studies to evaluate the organizational readiness, before the implementation of this plan in the organization. Through providing the score, fuzzy expert systems show the organizational readiness for managers. By combining several systems and establishing the system, organizational readiness, and domains where the organization is in trouble are shown. The purpose of this paper is to design a model by combining several systems to specify the areas in need of improvement to enhance the readiness of the organization while showing the readiness of the organization.

LITERATURE REVIEW

Enterprise Resource Planning Systems

An ERP system is an information system consisted of support software modules. "Some of these modules include utilities for marketing and sales, field service, product design and development, production and inventory control, procurement, distribution, industrial facilities management, process design and development, manufacturing, quality, human resources, finance and accounting, and information services" (Anderegg, 2000; Larson, Carr & Dhariwal, 2005).

According to Al-Mashariand and Al-Mudimigh (2003), an ERP system is an information technology (IT) infrastructure that facilitates information flow within the organization, with suppliers, and with other members of the supply chain. Davenport, Harris, and Cantrell (2004) and Laframboise and Reyes (2005) indicated that ERP combines business processes in both the organization and IT into one integrated solution and is a way of doing business, not merely a software package. An ERP system contributes to technical areas such as standardization, transparency, and globalization (Akkermans et al., 2003; Kuei, 2002). Moreover, ERPs assist enterprises in automating and integrating corporate cross-functions (Malhotra & Temponi, 2010, 29). Pereira (1999) indicated that a well-managed ERP could be determinant of strategic competitive advantage. The literature has outlined some of these achievements that can be realized by an organization, including:

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