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IMPACT OF STRATEGIC KNOWLEDGE MANAGEMENT (KM) PRACTICES ON ERP SYSTEMS IN SELECT MANUFACTURING ORGANIZATIONS IN SAUDI ARABIA

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Abstract

Since ERP has successfully augmented business capacities through production network administration and building client interface in an organization. The main objective of ERP usage is to enhance business performance and reduce costs. Due to increased dependence on knowledge and aligning business strategies with learning, several new capabilities, technical as well as infrastructural, have been developed in order to assist in decision making and smoothening the ERP implementation across all business units. We identify non-linear and non-stationary empirical tools in order to enrich the research methods used for implementing KM practices. the adoption of methods such as Pearson Correlation methods and the Kruskal Wallis and Mann-Whitney Tests will help to predict numerical values, and to get a more accurate condition for the implementation of the KM practices . This study would be an innovation as it aims to introduce an improved algorithm applicable in a multi-functional and multi-scale scenario of a manufacturing organization. This algorithm will break down complex issues into simpler models and smoother, more stable and more regular patterns.

Keywords: Knowledge Management, ERP system, Non-linear, Non-Stationary, KW test

INTRODUCTION

So far ERP has successfully augmented business capacities through production network administration and building client interface in an organization. The main objective of ERP usage is to enhance business performance and reduce costs. Additionally, with the implementation of the ERP, there has also been cross-functional collaboration and coordination across the organization. ERP has thus institutionalized business procedures and information technology as best practices. However with the introduction of new technology, growth of knowledge and increased global competition, the ERP systems in organizations have started facing challenges and issues. For instance, cloud-ERP system is a response to the knowledge explosion and an attempt to increase the ERP capabilities of storage and retrieval of data.

Such a paradigm shift in ERP usage has been made possible through strategic KM practices. Due to increased dependence on knowledge and aligning business strategies with learning, several new capabilities, technical as well as infrastructural, have been developed in order to assist in decision making and smoothening the ERP implementation across all business units. For instance, KM used the company intranet as a virtual tool to develop collaboration and share new knowledge with the employees.

LITERATURE REVIEW

In most manufacturing organizations of the recent timers, a paradigm shift was felt in the domain of Enterprise Resource Planning (ERP) system when it expanded itself from the confines of the information systems domain to strategic planning and policy making. The reason was that various strategies such as cost efficiency, product design, adaptability, availability of resources, and configurable of products and services in order to gain competitive advantage were linked with knowledge management and continuous learning practices of an organization. For instance, recently the adoption of cloud ERP as a knowledge storage and retrieval resources, has gained much popularity in several developing countries. Likewise, there are several other innovations and ERP- Technology driven practices that are evidence of growing dependence on knowledge management practices and their linkages with business strategies. A detailed and annotated literature review in the study will be made to address to all these issues. The following is a glimpse of it.

Enterprise Resource Planning (ERP)

According to Botta-Genoulaza& Pierre-Alain (2006), an ERP system is “an integrated software package composed by a set of standard functional modules (Production, Sales, Human Resources, Finance, etc.) which attempts to integrate all these functions across a company onto

a single computer system in order to serve needs of individual department holistically." Hence, in this study, the ERP shall be understood as that system in an organization which integrates various business units and allows a cross functional productive interaction between sales, marketing, finance, and human resource management functions (Samwel& Patrick, 2013; Pelsak, 2006; Samaranayake, 2009). The ERP as a technology not only supports the flow of information across these internal functions and their daily operations and decision-making (Sternad et al., 2011; Pishdad & Haider, 2013; Garg & Garg, 2014; Beheshti et al., 2014; Ifinedo& Nahar, 2009; Garg & Chauhan, 2015) but also creates a database for all stakeholders' interests (Bidgoli, 2004; Liu, 2011). Most of the studies indicated that the adoption of the ERP system in an organization helps enhancing business forms and diminishing operation costs (Beheshti, 2006); establishing collaboration between all business units and procedures (Harrison, 2004) improving the compatibility of workflow within the functional departments (Romney & Marshall, 2012; Mike & Andy, 2001) and improving the prediction of new business operations in different markets (Yahia, 2010; Galy&Sauceda, 2015; Ram et al., 2013).

ERP also closely works with other implementation strategies such as e-commerce, customer relationship management, strategic knowledge management, inventory management, and project management systems Huang & Yasuda, 2016; Gavidia, 2016). As far as strategic KM and its impact on ERP systems is concerned in manufacturing organizations, the subject of the current study, it is felt that strategic KM unite together with ERP and their synergy is seen in activities such as product data management, automated data collection, compliance management, lean processing, total quality management, advanced planning and scheduling and product life cycle management. Hence, by integrating business strategies and KM practices with the ERP system, it is beneficial for both operations and efficiency to the organization. Often, ERP systems are also developed to resolve data fragmentation issues in organizations (Ahmad & Cuenca, 2013) and attempt to evolve a unified database for managing all the functions of tan organization (Graham, 2009)

To give a few examples, ERP contributes to data management by keeping a track of numerical data, statistical results of experiments, designs, inventory, quality measures, routes of product so that any life cycle change within a product can be managed and controlled. The ERP is also capable of accomplishing data accuracy with the help of modules like Master Production Schedule (MPS) and Materials Requirement Planning (MRP) on all types of production lines. ERP tools also assist in all manufacturing operations and quality control benchmark by inspecting and testing raw material, in-process-material and the finished product. The inventory or process management is made much easier by using standardized ERP

procedures in manufacturing organizations such as Kanban and JIT leading to lean Sigma standards and supply management excellence.

The Critical Success Factors (CSFs) for ERP Implementation

In spite of ERP benefits as mentioned above, there are various risks and challenges in the execution of the ERP system. Huang et al. (2004) identifies a few "dangers" including lack of administration and inadequate top management support, insufficient client coordination resulting in conflicts, failure to update business regulatory practices, and inadequate innovation and knowledge management practices. Other serious problems identified are poor planning, inadequate training for end users and their incompatibility with ERP package, high installation and training costs, and lack of coordination with business processes, (Ghosh, 2012; Umble & Umble, 2002). Besides, ERP implementation is considered as costly, complex, and hence has high failure rate (Ahmad & Cuenca, 2013; Suna et al., 2015).

To cope with these challenges and ensure a successful implementation and reduce the failure rate, a few CSFs have been identified in previous studies (Al-Mashari, Al-Mudimigh, &Zairi, 2003; Esteves-Sousa & Pastor-Collado, 2000; Holland & Light, 1999; Umble, Haft, &Umble, 2003). These include management support, training and education, ERP package selection, business process reengineering, project management, vendor support, consultant support, technological infrastructure, change management, business plan and vision, and good communication with all stakeholders and most importantly integration of knowledge management practices.

Knowledge Management and ERP implementation

Tom Davenport (1994) defined Knowledge Management as "the process of capturing, distributing, and effectively using knowledge" and intranet serves as the in-house knowledge platform and an ERP tool to make data and information accessible to geographically dispersed units of an organization. With the help oif KM and in order to resolve strategic challenges, ERP tools and techniques such as dashboards, data locators, navigators, best practices databases, have been developed. KM practices in manufacturing organizations are particularly required for creating a learning environment and a continuous improvement schedule. It is accomplished through creation of databases on the company intranet and synergizing them with ERP packages resulting n expansion of the capability of ERP (Lekenes and Munkvold, 2006) and bringing diversity in the ERP usage process.

Vandaie (2008) recommends two types of synergy between KM practices and ERP usage: one, managing the strategies within knowledge processes and learning acquired;

second, concentrating such knowledge processes and newly acquired learning within the ERP package and plan their usage in the organization. In this way, knowledge and learning are shared at all functional levels of the organization. A few researchers (Vandaie, 2008; LeknesMunkvold, 2006) have even asserted that KM and learning supplement ERP in organizations as their synergy systematizes procedures and increases data handling capacity of the organization. Hill et al. (2007) observe that strategy management is not only engaged in formulation, analysis, and implementation of strategies, but also in monitoring their performance and resolving strategic both internal and external issues. Due to the growing use of technology and geopolitical competition, it has been a challenge to manage organizations strategically. In such a state, knowledge management and continuous learning systems are introduced to lessen such turbulence.

Strategic Knowledge Management Models

Each organization has its own unique knowledge management strategy and modeling system for problem-solving, decision making and making improvement. A few models include Nonaka and Takeuchi Model where the focus is on knowledge creation and innovations; or Zack Knowledge Management Model, where refinements takes place in the KM cycle besides its acquisition storage and retrieval through a ERP based distribution system. Similarly, there is Bukowitz and Williams Model which is basically a management framework that includes information databases, information technologies, communication infrastructure, organizational intelligence, skills, and all types of know-how. Another KM model is Karl Wiig's WIIG Model which emphasizes that knowledge could be useful and valuable only if it is organized and synchronized.

All these KM models have one thing in common: their ultimate objective is to make the organization as an intelligent unit that facilitates the creation, storage, retrieval, deployment and distribution of knowledge through an indigenized KM cycle. When such a process starts in an organization, it deeply impacts its ERP system which is modified and customized to meet the challenges created due to the strategic KM practices. The ERP system has already been seen as "a technology that integrates and automates the key business processes" (Aldayel et al., 2011) supporting business processes to achieve operational excellence, improving the decision-making process, and ensuring the survival (Laudon & Laudon, 2012; O'Brien & Marakas, 2010).

RESEARCH OBJECTIVES AND CONCEPTUAL FRAMEWORK

Research Objectives

This study focuses on the development of research objectives as under:

1. With regard to Saudi Vision 2030 which emphasizes on the creation of a knowledge economy, this study will investigate how Strategic knowledge management practices can influence the ERP usage and build to a very effective IT-enabled organizations
2. Manufacturing organizations in Saudi Arabia are looking for solutions to their data retrieval issues and challenges in the event of change in their business processes. This study will examine how novel KM practices can contribute to data storage and data retrieval systems within the existing ERP systems and whether there is a need to modify, redesign or replace the ERP package.
3. In order to build a knowledge economy, there is a need to align business strategies with learning and knowledge activities of an organization. In other words, there is need to create a learning organization involved in continuous innovation and growth. This study will attempt to identify what strategic KM practices could be adopted to accomplish these objectives and how these KM practices are useful to the ERP system of the organization./
4. There are various critical success factors (CSFs) that can be introduced in order to launch a successful KM system in an organization. This study will first identify risks and challenges that a manufacturing organization might face in the absence of such CSFs and then will recommend solutions that can be effectively used to resolve such items.
5. Last, but not the least, a globally advanced knowledge integrated manufacturing organization needs a highly equipped information retrieval system. Organizations are looking for a platform that can integrate their various internal functions and also provide them an opportunity to coordinate with their external stakeholders like customers and suppliers. This study will attempt to find out how manufacturing organizations can make use of the newly developed ERP systems to accomplish this integration.

Based on the above scientific issues, this study proposes to test and investigate the research model and methods, and to systematically lay out the research content.

Conceptual Framework

The relationship between strategic KM and the ERP system shall be investigated through a structural equation modeling (SEM) based study on the data collected from Saudi manufacturing organizations. The conceptual framework includes Knowledge management as an independent variable and its various principles playing a mediating role between the ERP system and its operational performance in the sampled organization. It is hypothesized that

there will be a positive and significant relationship between all variables with ERP a precedent variable to KM.

RESEARCH METHODOLOGY

For the purpose of the study, a descriptive research design was adopted. With the help of SPSS software, descriptive statistical methods (e.g standard deviation, coefficient, averages, percentages, paired samples T-test, standard deviations, simple regression analysis tests and normal distribution test) will be used to analyze the variables of the study and their basic qualities as well as to test the hypotheses of the study. The comparisons will be made between their average values during the last five years of adoption of KM practices and what new ERP models on IT regulations have been adopted leading to changes of statistically significant differences in the variables of this study.

During the sampling phase, prior to the selection of the organization, field visits will be made to a number of organizations to confirm the sampling conditions. The purposive sampling method will be used to identify four manufacturing organizations that would meet the conditions of this study particularly that it should be implementing the ERP system and must have recently introduced learning and innovative practices under their KM programs. This framework will also help understand the impact of strategic KM practices on information systems as well as on supply chain operations as they key parts of the ERP system. For the qualitative analyses of interview transcripts, the study will employ the content analysis method in order to identify categories and themes.

The adopted instrument to measure the ERP Systems in Manufacturing Organizations in Saudi Arabia was based on the performance instruments used by Morgan (2003), Cao and Schniederjans (2004), Sin et al. (2006) and Sabherwal and Chan (2001). This instrument is a synthesized measure which was made using combination of traditional accounting-based items, market growth, profitability, company reputation, and product-service innovation. In the study, independent variable was Strategic Knowledge Management KM.

Question: is there an Alignment of KM to the business of the firm?

Question : what is your firm level of Knowledge Communication and Collaboration

Question : what is the firm Knowledge Documentation

Question: what is the firm Knowledge Management Lifecycle

Equation

$Y = F(S, \varepsilon)$

Y is the ERP Systems in Manufacturing Organizations, G is the Strategic Knowledge Management KM, , ε is the error term

RESULTS AND DISCUSSION

Table 1. Results of the Equation.

KM	Fuzzy			ERP	Fuzzy			Common concept	Result
Continual development of knowledge	0.31	0.44	0.7	Continues improvement	0.52	0.76	0.93	Continues improvement and continual development of knowledge and information	R
Final system acceptance	0.31	0.45	0.7	Integrate the completed system to the daily operation	0.4	0.6	0.8	Final system acceptance, integrate the completed system to the daily operation	R
Connecting knowledge between suppliers to customers	0.39	0.59	0.79	Connecting suppliers to customers	0.34	0.53	0.75	Connecting suppliers to customers	R
Reward people	0.28	0.41	0.67	Reward people	0.43	0.63	0.83	Reward people	S
Final users training and performance support	0.62	0.9	1	Transfer responsibilities to the final users	0.57	0.83	0.98	Final users training and performance support	R
Conduct reviews and closing project	0.44	0.64	0.84	Conduct reviews and closing project	0.4	0.59	0.8	Conduct reviews and closing project	R

This study will also face issues related to calculating the combined return on investment (ROI) while implementing KM practices on the ERP system of all functional units of the organization under study namely sales and marketing, production, accounting and finance, and human resources. The easy solution would be to calculate the earnings per share of each unit both prior to the implementation of the KM practices and post implementation in each sampled organization. The statistical tests would indicate a strong statistical significance in the differences in average earnings per share (EPS) of both pre and post implementation of KM practices. The study will also have to limit the measurements of financial performance based on ROI as well as EPS in the manufacturing organizations under study.

CONCLUSIONS

This study would be an innovation as it aims to introduce an improved algorithm applicable in a multi-functional and multi-scale scenario of a manufacturing organization. This algorithm will break down complex issues into simpler models and smoother, more stable and more regular patterns. These new models will then be used with different scales making it much easier to analyze and predict. This will enable to issue early warning for effectively capturing multi-functional and multi-scale characteristics in order to improve the accuracy of forecasting and also optimize the implementation KM practices thereby reducing all kinds of constraints in improving the ERP system.

We Identified non-linear and non-stationary empirical tools in order to enrich the research methods used for implementing KM practices. the adoption of methods such as Pearson Correlation methods and the Kruskal Wallis and Mann-Whitney Tests will help to predict numerical values, and to get a more accurate condition for the implementation of the KM practices .

The research still has some limitations. First, we only focus on the KM practices, to some extend the conclusion are shortsighted. Second, the method is based on some improved algorithms in a multi-functional and multi-scale scenario which may add some complexity and uncertainty of the algorithms. But anyhow, this paper still shows a promising direction to this issue.

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