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Knowledge Map and Enterprise Ontology for Enhancing Business Process Reengineering In Healthcare:
A Case of Radiology Department

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ABSTRACT

The spending in healthcare is constantly increasing according to available data, and the resource consumption does not actually reflect expected improvement in the healthcare services. As a result there is urgent need for healthcare to reengineer their business process in order to achieve improvements in critical area such as cost and quality. To address this issue, this study proposed a method based on design science approach by integrating knowledge map, enterprise ontology and lean in order to find the non-value added transactions and subsequently reengineer them to enhance healthcare efficiency. Enterprise ontology provides a details and better understanding of dynamic nature of an organization as such was chosen for as basis for this study. The method was demonstrated in radiology department making it possible to find and addresses non-value added transactions and subsequently reengineer the department. Evaluation was carried out by means of descriptive method using Moody and Shank framework and interview with healthcare practitioners. The finding shows that the method has enhanced healthcare efficiency by eliminating non-value added transactions.

KEYWORDS

Business Process Reengineering, Enterprise Ontology, Healthcare, Knowledge Map

1. INTRODUCTION

As the business is growing and becoming more dynamics, couple with high rate of organizational changes and technological breakthrough a lot organizations are forced to continuously reengineer in order to compete both internally and externally (Kotter, J.P., 1996; Henriques, et. al., 2010). The need for innovation and strong external force are serious threat and challenge for healthcare systems. Subsequently, healthcare organization need to overcome these challenges by eliminating non-value added transactions, eliminate or reduces waiting time by implementing new technological services (Christensen, et. al., 2009; Kaplan & Porter, 2011)

Literatures have shown how implementation of Business Process Reengineering (BPR) help many organizations achieved dramatic breakthrough performance in terms of saving cost, quality and services. Popular example is Motorola, when faced with the challenge of high rate of defect percentage and longer cycles times, decide to totally redesign its parts and tooling process, and at the same time upgrading manufacturing facilities. This BPR process was also able to cut the production cost by one billion US Dollars per year (US$1) and cut cycle time by half. Hallmark also achieved 75% decrease in introduction time on cards (C Ranganathan & Jasbir S., 2001)

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Meanwhile, a survey conducted by a D. Little consulting firm indicated that 85% of the top management of an organization were not happy or satisfied with the outcome of the reengineering project (Kleiner A., 2000). This is in line with the series of research conducted in the early 90s which indicated that 70% of the reengineering programs had only delivered less than what they are expected to do otherwise had fails (Grover, V., 1999)

Therefore, even though a lot of organizations embraced the concept of this BPR programs, only few of them immerge successful in their effort. Study indicates that many top management of organizations are disappointed with the result of the program (Moad. J., 1993). And that the failure rates are as high as 70%[9]. The initiation and diffusion of the BPR like most of the management concept follows S-shaped curve. When this concept was first introduced in early 90s there was an overwhelming success and large scale acceptance. After spate of failures and difficult nature in implementation, the initiatives become serious challenges to both the researchers and practitioners (Rao et. al., 2012)

This high rates of failures prompted researchers in that field to view the concept of BPR as a passing management short-lived fashion. Some of the earlier approach of the programme is changing and the researchers are now looking PBR as not only process change but overall organizational change (Rao, et. al.,2009).

The reasons behind this many failures have been discussed by so many researchers, and number of reasons have been provided as to why these previous success is no more releasable. Among the factors deliberated is focusing on only the steps in the business process and giving little emphasis to the environment within which the reengineering program is taking place[9]. This situation makes it difficult for the BPR team to visualize certain knowledge available in the organization where the program is taking place. The second reason discussed was lack of appropriate tools for proper modeling and integration among the various enterprise elements of the business process of an organization undergoing BPR. Even though there are so many available tools for modeling but so many of them only support diagrammatic modeling only (Vergidis, et. al., 2008).

This study intends to address the issues with regards to lack of proper understanding of the environment where the business process engineering is taking place and also provides proper tools that support the enterprise description of the organization. The issues related to environment understanding can be best resolve by applying knowledge management technique like knowledge structure map which can give an insight into different roles which come together to perform a set of tasks and therefore can be used to identify the know-what and know-how (Eppler, 2001). This is a knowledge mapping technique can be used to visualize all available knowledge within the environment and at the same time find the source of the knowledge and the opportunity for creating new one (Ali, et. al., 2015). Knowledge map also help in identifying the experts and how to share their expertise as well as determining knowledge competencies available within the organization and their corresponding interactions (Alavi, & Leidner, 2001; Vail, 1999). The lack of integration among the various enterprise elements at the design level and appropriate tools that focus not only on the business process but also the enterprise description of the organization can be best tackle with employing enterprise ontology, which is considered as having a strong and well-formed theory, provides a better understanding of the dynamics of an organization, and allows a good alignment between the enterprise design and the enterprise operation (Pascoa, 2012).

This study also considers adopting a proven benefit of Lean approach of continues improvement in healthcare by making the enterprise ontology as an input to the plan step of *paln-do-chech-act* (PDCA) framework. This will help in identifying the possible room for improvement and subsequently prioritizing the improvement using impact and feasibility analysis.

In this study we employ Design Science Research Methodology (DSRM) approach (Hevner, et. al., 2004) in order to develop a method that incorporate a number of existing techniques like knowledge