KPI-Based Decision Evaluation System to Enhance QMSs for Higher Educational Institutes

Abdelkerim Rezgui, Carl von Ossietzky University of Oldenburg, Oldenburg, Germany
Jorge Marx Gómez, Carl von Ossietzky University of Oldenburg, Oldenburg, Germany
Raji Ben Maamouia, University of Sfax, Sfax, Tunisia

ABSTRACT

Innovation has always been the engine of economic growth. Nowadays, billions are disbursed on research and universities are working increasingly closely with industries to help them developing new products and processes. In order, to maintain this important role and be more competitive, higher education institutions (HEIs) are trying to assure a high level of quality by following standards and using a sophisticated quality management system (QMS). The use of decisions support systems as enabler for QMS is an approved concept. However, it is not well introduced in the field of education despite its proven results within other domains. Here, we aimed to enhance the decision-making act in the application HEIs through the presentation of a novel concept called decision evaluation system. This system enables stakeholders to track, evaluate, recommend and comment decisions. It meets the recommendations of ISO 9001:2015 and specially the quality management principle 6: “make decisions based on evidence.” In this work the global process and the reference architecture will be presented. In conclusion, our work shows that HEIs take advantages from historical decisions and increases the ability to review, challenge and change opinions based on experience and knowledge sharing.

KEYWORDS

INTRODUCTION

Innovation has always been the engine of economic growth. Nowadays, billions are disbursed every year on research and universities are working increasingly closely with industries to help them developing new products and processes. This involvement of industries has set the level of expectations very high, whereby the above means that higher education institutes (HEIs) face a huge challenge. Thus, to maintain this important role and be more competitive, HEIs are trying to assure a high level of quality by following standards and guidelines as part of their academic tradition by using a sophisticated quality management system (QMS). This can help the coordination of activities in the
organization to control and improve the efficiency and effectiveness of its performance (Petkovska & Gjorgjeska, 2013)

This paper introduces a new KPI-based decision evaluation system to enhance QMS for HEIs. In fact, decision support systems (DSSs) are sufficiently mature and very important for any organization regardless of their domain (education, automotive, finance, etc.) (Power, Sharda, & Burstein, 2015). Unfortunately, this concept is not well introduced in the field of education despite its proven results within other domains. And even when it is, it simply analyzes current and historical status and does not take advantage from past decisions and its impact on the institution.

The proposed approach differentiates between “first-level” knowledge and “advanced-level” knowledge. The “first-level” knowledge is widely used by traditional DSSs. It transforms data into knowledge and presents gathered knowledge to the end users, helping them in their decisions. It is essentially data manufactory with the purpose of helping users to obtain knowledge. This knowledge offered to end-users does not include information about the decision itself, namely the evaluation, responsibility (decision-maker), decision time and affected domain. The extended version of the “first-level” knowledge - “advanced” knowledge - includes the knowledge provided by the first level and extends it with the knowledge about the decision itself (Rezgui, 2014).

This article presents a reference architecture for the new approach called a KPI-based decision evaluation system and its integration in QMSs for HEIs. Accordingly, the remainder of this paper is organized as follows. After a brief introduction and presentation of the research methodology, section three provides the main background information about quality management systems (QMSS), decision support systems (DSSs) and their use in HEIs. In addition, we will discuss the decision-making process. In section four, the proposed KPI-based DES will be explained. Section five shows the reference architecture of the KPI-based DES with its characteristics and components. Subsequently, the steps followed to integrate DES in QMS for HEIs are detailed in section six. Section seven presents the main outcomes of the proposed solutions and shows how DES can enhance QMS for HEIs. The article then concludes with a brief summary regarding the contribution of this content.

RESEARCH METHODOLOGY

Here, we aimed to enhance the decision-making act in the application domain higher education institutes through the presentation of a novel concept called decision evaluation system. It should meet the recommendations of the quality management standard ISO 9001:2015 and specially the quality management principle 6: “make decisions based on evidence balanced with experience and intuition”. It should also comply with the understanding and use of Simon’s phases in the decision-making process (Simon, 1960). We followed by the establishment of this work the design science research methodology (DSRM) by (Peffers, Tuunanen, Rothenberger, & Chatterjee, 2007). We proceeded in this research with a problem-centered approach resulted from the observation of the absence of a decision evaluation system for quality management systems in higher education institutions. Based on the recommendation of (Webster & Watson, 2002), in order to identify the problem and motivate the work, a systematic literature review was made. A huge amount of research papers in the area of information systems related to decision support systems, quality management systems for higher education institutes and decision-making process were conducted. The objective design of a Decision Evaluation System to Enhance Quality Management Systems for Higher Education Institutes was fixed. The functional and non-functional requirements definitions are assured in order to enable the implementation of the global system process with its reference architecture. The demonstration is assured by a prototypical implementation (proof of concept) and a concrete business use case. The results obtained are evaluated by comparing them with the defined objectives. A process iteration based on the output of the results and feedback coming from the evaluation and communication activities allows the modification and adjustment of the objectives and the artifact.
An Application of the Integrated IBA-TOPSIS Model in Supplier Selection
www.igi-global.com/article/an-application-of-the-integrated-iba-topsis-model-in-supplier-selection/125884?camid=4v1a

Using Social Network Analysis to Support Collective Decision-Making Process
www.igi-global.com/article/using-social-network-analysis-support/53813?camid=4v1a

Improving Supply Chain Delivery Performance Using Lean Six Sigma
www.igi-global.com/chapter/improving-supply-chain-delivery-performance-using-lean-six-sigma/176788?camid=4v1a