A Knowledge Management Approach to the Loosely Coupled Systems

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ABSTRACT

The purpose of the research is to explore characteristics and design the concept of the knowledge management system that would be able to operate in a loosely coupled system. We used a literature review to determine characteristics of the conceptual design that would fit into the unstable organizational environment. Based on the theoretical insights, we designed the open framework that is capable of adjustments, multilevel designing, it allows integration of statistical methods and supports conversion into the web ontology language. We applied developed concept to a loosely coupled system test case, to achieve better understanding of its capabilities. The solution is appropriate for implementation to analyze knowledge network and process architecture relations in different informal organizational networks, as well as during events where spontaneous cooperation among different types of organizations and individuals is necessary, such as massive natural disasters and other simila events.

KEYWORDS
Knowledge Management, Knowledge Network, Loosely Coupled System, Open Framework, Process Architecture, Process Pattern

1. INTRODUCTION

Knowledge is regarded as the critical source to ensure sustainable competitive advantage for an organization (Jasimuddin, Connell, & Klein, 2012; Zhang & Jasimuddin, 2008; Jasimuddin, 2006; Jasimuddin, Connell, & Klein, 2005). Knowledge oriented processes within unstable organizational environments are challenging research problem, according to changes of the organizational system. Even tough fields like process management, knowledge management and loosely coupled systems had been already studied in details, practical formulations of these three fields together, has not been studied for the full extend. In this paper, we present the theoretical concept of process based characteristics of a loosely coupled system and develop the conceptual knowledge management solution for such system with the ability to analyze knowledge network evolution, process patterns and map system elements and ongoing dynamic. With the conceptual solution, we try to form a knowledge management framework that would be capable to operate within unstable organizational environments where processes are facing constant change, creating knowledge evolution that is hard to follow, record and assess. It is important to create an ability to the methodological approach towards knowledge managements within a loosely coupled system, due to the fact that a great number of such systems operate constantly as a creative part of our social environment, example: informal youth initiatives, financed by EC grants, local networking of non government organizations, cooperation among small farmers, etc. At the same time, loosely coupled systems emerge during threatening situations such as...
war conflicts, massive natural disasters, even smaller accidents where cooperation of many different organizations and individuals is necessary to achieve desired results.

The authors describe relations between process architecture and organizational system’s success as very important factor that can be elaborated to the level of a single activity, entity, knowledge node or link among these elements. At the same time they claim, the less tight organizational behavior encourages learning processes within an organization that influences more optimal operation of the organizational system. Researchers found that organizational learning is subjected to the change that is resulting out of systems’ change that appears through its process architecture, activity flows, information flows, business logic, etc. According to the state of the art, knowledge management approach to the loosely coupled system should enable enough openness to allow learners to be self-initiative and to participate within knowledge related processes in the system. Only the openness will successfully meet the uncertainty concerning the changing structure of a knowledge network, its content and at the same time deliver proper feedback about the state of the network. To be able to record the entire dynamic that we can reach through the open knowledge management system authors claim the implementation of the knowledge map is one of the best possible solutions.

Objectives of this research were to enlight important characteristics of the loosely coupled system from the process perspective and to define open conceptual solution for the knowledge management system that could be successfully implemented in such system, together with ability to create a knowledge map, follow the evolution of knowledge network, statistically analyze emerging knowledge based process patterns and to design to-be simulations of the system. We reached the objectives through the theoretical research of the unstable process architectures, where we focused on changing activity flows, loops within the process architecture and its outputs. We continued with entities that form the system, and described, how important it is that the knowledge management concept operates with the ability to include and map any kind of knowledge or information, important for the ongoing processes. At the same time it must be able to provide analytical tools for assessment of gathered data about knowledge network. Then we reveal how the knowledge map should be designed in order to meet the characteristics of knowledge network within the loosely coupled system and its rapid change and present graphic model of the knowledge management system for the knowledge network analysis, modeling and simulation. Finally, we apply designed open framework solution to a test case of simple loosely coupled system to verify its operating ability.

### 2. LOOSELY COUPLED PROCESS ARCHITECTURE AND ORGANIZATIONAL LEARNING

Process architecture presents a structural description of the processes within an organizational system, including all process components, such as: inputs, outputs, activities, entities, events, links and any other specific element of the organizational system. Ionita (2011) describes modern successful business organizations, as being strongly dependent on their business architecture in order to conduct their daily activities. Such enterprises boast with a stable organizational system that is at the same time capable of intended and controlled flexible adjustments. The process architecture supports both aspects of the system and must be robust enough to maintain delivery of desired process outputs. Barros and Julio (2011) argue the design of the relations among process’ components is one of the most important factors of the process architecture. Recognizing organizational knowledge as the one of the pillars of the organizational system, process architecture design would consequently not be able to provide sufficient process outputs without proper knowledge management. Niu (2010) highlights significant the relation between knowledge management and organizational adaptation, which reflects the relation between organizational knowledge and process architecture and indicates an influential connection between them in the unstable organizational system.

Important characteristic of the loosely coupled systems’ process architecture is constant change due to the dynamical interaction between activities and weak links between entities, which creates
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