A Framework to Develop the Business Engineering Approach Using Game Theory and Semantic Web

Maryam Ashoori
Higher Educational Complex of Saravan
Email: mashoori@saravan.ac.ir (Corresponding author)

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ABSTRACT:
Business is a main concern of human as selecting the suitable technologies on business model can cause its success or failures. Game theory is the new technology for sharing and keeping the knowledge that can use in business engineering approach. Also semantic web is a new generation of web that can provide a more productive and intuitive user experience. We intend using game theory in information systems layer and semantic in process layer of business model to extract tacit knowledge and share it.


1. INTRODUCTION
Nowadays, business is a main concept because of the ever-increasing in the global market. The most successful businesses are those that have made innovation a "must-have" activity. Creative in business tactics and strategies is innovation that it can be realized through business model [1]. The business model is defined as “the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities” [2] and it shows how strategy is concretely implemented [3]. One of the current business models is business engineering approach with strategy, processes and information systems layers. The strategy layer determines the business model and proposes the goals that need to be achieved for the success of the company. The process layer creates the output needed to fulfill the - strategy’s goals. The information systems support the processes for creating the outputs and in some cases for activating the processes in order to fulfill the requirements of customers [4] [5]. The aim of this paper is using semantic web and game theory to develop the business engineering model.

2. GAME THEORY
Game theory is the mathematical of interactive decision situations [6]. The theory of games extensively applies to the analyses of multi-player decision problems, where the players behave, in a conflicting or cooperative situation, to seek their optimal solutions. In one of those situations some agents make decisions, depending on their decisions an outcome results, and each agent has his own preferences on the set of possible outcomes. In the knowledge sharing game in Fig. 1, L moves first and decides whether to share or conceal his knowledge. F is informed of L’s choice and decides whether to share or conceal his or her knowledge. Note that the model allows F to decide whether or not to share knowledge, even if L has decided to conceal. After F’s choice, the game ends and payoffs are realized: $b_i$ ($i = L, F$) denotes a base payoff where $v_i$ is the value enhancement through sharing knowledge, $a_i$ is the exclusivity payoff, and $k$ denotes the expenses for sharing explicit knowledge [5].

![Figure 1: The Knowledge Sharing Game](image)

3. SEMANTIC WEB
The Web is a major source of accurate information for users. It is a dynamic environment that changes all the time. Finding relevant and recent information is therefore a hard task. This dynamic huge amount of data needs organizing, filtering and maintaining all the time [7]. Semantic web technologies are being developed to present data in standardized way such that such data can be retrieved and understood by both
human and machine [8] and it enables a flexible and seamless integration of applications and data sources. The semantic web provides intelligent access, an understandable context, and inferred knowledge [9]. Rules and ontology play a key role in the layered architecture of the semantic web, as they are used to ascribe meaning to, and to reason about, data on the web [10]. Ontology is the formal conceptualization of knowledge in a certain domain. Ontology is used to standardize the description of each aspect of business knowledge and facilitate the knowledge reasoning and retrieval. Web ontology language (OWL) is selected to encode the construction knowledge. OWL enables all information to be linked together and represented semantically in one semantic network [11]. Ontology languages on their own cannot fulfill all the prescribed requirements; rule languages should close at least some of the known obstacles [10].

4. PROPOSED FRAMEWORK

Proposed framework used semantic web and game theory on business process approach that it will increase the efficiency of business model. Ontology used to standardize the description of knowledge and rules used to extract tacit knowledge. Semantic web processes the arrived information in process layer based on defined ontologies and rules. New extracted tacit knowledge checks to determine it can fulfill strategies goals or not. If result is satisfactory, it will send to information system layer to preparing the outputs (Fig. 2). Information system layer used game theory for sharing the output according strategies goals. Based on goals priority, it makes decision to share or conceal tacit knowledge and how much. If information system layer shares tacit knowledge, it will achieve \( b_f + v_f - k \) benefit but if it conceals knowledge, it will achieve \( b_c + v_c + a_c \) benefit. Information system layer is follower because information and knowledge gave to business model. Proposed framework can conceals tacit knowledge and prevent the presentation of valuable knowledge based on strategies goals.

5. DISCUSSION AND CONCLUSION

Semantic web technology used to extract tacit knowledge based on defined rules and ontology. Also, game theory used to share or conceal tacit knowledge. Proposed framework conceals the tacit knowledge that it was valuable, and it will use to progress the business. The value of knowledge related to strategies goals because knowledge according to business strategies identify valuable. Using semantic web and game theory in business engineering approach cause increment of innovation. If innovation used, the agility of corporation increases that it occurs market share increases. In this situation, business benefits from valuable knowledge and exclusives it for its. Proposed approach conceals tacit knowledge and presents the valuable knowledge based on strategies goals of corporation.

REFERENCES

Figure 2: Conceptual Model of Proposed Framework