An Idea Ontology for Innovation Management*

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ABSTRACT

Exchanging and analyzing ideas across different software tools and repositories is needed to implement the concepts of open innovation and holistic innovation management. However, a precise and formal definition for the concept of an idea is hard to obtain. In this paper, the authors introduce an ontology to represent ideas. This ontology provides a common language to foster interoperability between tools and to support the idea life cycle. Through the use of an ontology, additional benefits like semantic reasoning and automatic analysis become available. Our proposed ontology captures both a core idea concept that covers the ‘heart of the idea’ and further concepts to support collaborative idea development, including rating, discussing, tagging, and grouping ideas. This modular approach allows the idea ontology to be complemented by additional concepts like customized evaluation methods. The authors present a case study that demonstrates how the ontology can be used to achieve interoperability between innovation tools and to answer questions relevant for innovation managers that demonstrate the advantages of semantic reasoning.

Keywords: Innovation Management, Integration, Ontology, Open Innovation, Semantic Web

INTRODUCTION

What is an idea? How does it relate to an innovation? While people may have an intuitive understanding of what these terms mean, there is no accepted precise and formal definition for the concept of an idea. As holistic innovation management and, in particular, the concept of open innovation gains traction, it becomes increasingly important to close this gap: a commonly agreed concept of an idea would support exchanging and analyzing ideas across different idea platforms and innovation tools, and hence be the basis to realize the vision of open innovation (Chesbrough, 2006; Gassmann

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In this paper, we provide our own definition of the concept of an “idea” and introduce an ontology to represent ideas. Our research was motivated by the observation that various innovation management systems implement the concept of an idea based on similar core concepts but also distinct features. The goal is to capture the common core of different approaches to facilitate reuse and better integration. We also want to allow modular extensions required for the needs of specific innovation tools. Hence, we present a core idea concept that is enriched by concepts required to deal with ideas, e.g., rating, collaboration, tagging, or grouping of ideas. Thereby, we also illustrate how the Idea Ontology can be complemented by further concepts like customized evaluation methods.

The remainder of this paper is structured as follows: first, we study the challenges that arise as a result of recent trends in innovation management. We suggest meeting these challenges by following an ontology approach and analyzing related work. Then we describe our idea ontology in detail followed by an evaluation section. Using a case study, we demonstrate how technical integration between innovation tools has been achieved and how the ontology can be used to answer questions relevant for innovation managers in order to demonstrate the advantages of semantic reasoning. Finally, we discuss the results of the case application and identify opportunities for future work.

**Innovation Management**

The Oxford English Dictionary defines an idea as: “1 a thought or suggestion about a possible course of action. 2 a mental impression. 3 a belief.” An innovation is defined as: “1 the action or process of innovating. 2 a new method, idea, product, etc.” Rogers defines an innovation as “an idea, practice or object that is perceived as new by an individual or other unit of adoption” (Rogers, 2003). This definition indicates that an innovation is more than an idea. To become an innovation, an idea has to be adopted. This concept is further developed by linking an idea or invention not only to adoption but to the concept of commercialization. Thus, Porter defines innovation as “a new way of doing things (termed invention by some authors) that is commercialized” (Porter, 1990). A precise definition of the meaning of the term “innovation” has been contentious and problematical and terms are often used loosely and interchangeably (Storey, 2000). However, there seems to be agreement on a general distinction between “invention” and “innovation” (Storey, 2000). Bullinger (2008) defines an innovative idea as “the more or less vague perception of a combination of purpose and means, qualitatively different from existing forms.” She thus claims it to mark the starting point of an innovation activity. As innovative ideas form the basis of innovation, idea collection and development is considered one of the first steps in most innovation process models (e.g., Cooper, 1990; Tidd, Bessant, & Pavitt, 2005; Wheelwright & Clark, 1992).

In the context of providing a tool to support the management of innovation processes, these definitions are not adequate because they do not specify (1) what information should be conveyed in an idea and (2) which methods or operations are applied to ideas. Hence, for the purpose of developing a semantic representation of the concept of an idea in innovation management applications, we informally define an idea as:

*An explicit description of an invention or problem solution with the intention of implementation as a new or improved product, service, or process within an organization.*

This central concept of an idea which we term Core Idea can be supplemented with various concepts that relate to feasibility and marketability, i.e., commercialization. Many of these concepts are used in the selection of tools that have been developed to support the different phases of idea generation and idea evaluation (van Gundy, 1988; see also Ardilio,
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