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FOLKSONOMIES TO ENHANCE THE KNOWLEDGE ORGANIZATION AND MANAGEMENT

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Abstract

The paper examines theoretical assumptions of the new models for knowledge organization in support of knowledge management. Based on the research of literature, authors try to define roles of folksonomies, as a new information management tool and traditional knowledge organization tools, such as taxonomies in business environment, specifically in the Enterprise 2.0. Furthermore, issues of social aspects of folksonomies and their role of knowledge sharing are also examined.

Keywords: folksonomy, web 2.0, knowledge organization, knowledge management.

INTRODUCTION

Advancement of the ICT has brought new ways users are searching, accessing and using information. The emergence of the Web 2.0 has revolutionized the way information is designed and accessed over the Internet. This new environment is based on interactivity and user control creating a new kind of users so called *prosumers* i.e. producers/consumers (Toffler, 1980) which are challenging traditional knowledge organization models. The content organization is challenged by a new model of indexing based on social classification or collaborative tagging, creating the folksonomies phenomenon, where users are enabled to create not only content but a richer, more adaptive and responsive way to navigate and search both existing and new media. Traditionally, knowledge organization

used in information institutions such as libraries was based on dual indexing approach: the author, indexing his work by using a set of keywords thus giving a more subjective description of the document, and information specialists or librarian, indexing by using controlled vocabularies or objective approach to the document content. Today's access to information and knowledge has spread around the web creating a broader information space with the indexing practice based on the combination of three instances: author, user and interpreter. The result of this new interaction is creation of folksonomies i.e. collaborative tagging and method of collaboratively creating and managing tags to annotate and categorize content. (Zauder, Lasić-Lazić and Banek Zorica, 2007). With the aid of folksonomies the end user i.e. reader is no longer just a passive consumer but is able to contribute to the indexing playing and active role in indexing and retrieval process. The user-created tags are searchable for everyone beside the interpreter-created controlled terms and the author-created text words and references (Stock, 2007).

The parallel co-existence of different indexing approaches poses a challenge to both information specialists and the field of knowledge organization and management in general. Coping with two parallel modes of knowledge organization - traditional tools for knowledge organization like taxonomies, ontologies and classification schemes based on the interpreter viewpoint of the document which presents objective and sometimes rigid approach; and a growing popularity of the social classification and folksonomies based on the user viewpoint of the document tags presenting a personal organization of information together with the subjective and democratic approach. Using just one of these approaches is not sufficient for successful knowledge sharing and discovery. What needs to be done is a successful merging of these two approaches. Field of research is putting much effort in combining various controlled languages with collaborative tagging phenomenon in order to improve users' information retrieval. Lin et al. (2006) reported on three empirical studies on the characteristics of social classification, comparing social tags with controlled vocabularies and title-based automatic indexing.

Still, these problems are not only influencing the information institutions but also to the business environment and field of knowledge management. The penetration of web 2.0 philosophy in business environment created the Enterprise 2.0 - environment based on mass collaboration supported by anyone, anytime anywhere approach due to the technology advancement. Chen, Chang and Liu (2012) state that recently both business executives and academics have recognized knowledge sharing as a critical enabler for individuals to create value and sustain a competitive advantage in a rapidly changing environment.

Based on collaborative practices and usage of various platforms, an important feature of these services is the collaborative aspect, since most of the tools provide live information spaces and documents that lead to writable, user-driven and evolving information systems, as opposed to traditional information management architectures with complex workflows and publishing procedures (Bresslin, Passant and Decker, 2009). Knowledge management field has started to

utilize the Web 2.0 tools in communicating with customers but as well as to manage internal collaboration. Traditional collaborative technologies that are document and text-centric are no longer enough to drive innovation and productivity. Social networking bridges the divide between text and rich-media-centric tools (Cisco, 2010). Apart from using traditional knowledge organization tools folksonomies have shown to be a good solution for internal collaboration.

1. WEB 2.0 IN BUSINESS ENVIRONMENT, ENTERPRISE 2.0

Although influenced by the development of web 2.0 phenomenon, Enterprise 2.0 emerged due to the several other changes in the business environment. Firstly, there is the penetration of the generation Y in the business environments and secondly, the change in the nature of customers which are no longer just passive receivers of advertisements and company messages. The new customers are sophisticated and sceptical, and active in seeking out the information, opinions, products, and services that interest them. They expect more personalized experience. On the other hand, the new worker is mobile, independent, part-time employee, contractor or consultant. He is a knowledge worker who tends to be more loyal to their network of colleagues and professionals than to company. This poses challenges to traditional management practice but also transforms the knowledge management.

Enterprise 2.0 includes the use of web 2.0 technology and its social software in the business environment creating a collaborative space for companies to connect with their partners, customers but also within themselves. Term Enterprise 2.0 was coined by McAfee (2009) who tried to describe the penetration of new concept in the business environment by presenting the SLATES model:

- Search: using web search or the equivalent to locate information;
- Links: the use of links in an intranet or other shared network to indicate knowledge that would be of use;
- Authoring: enabling a wide range of people within an organisation to create and contribute to the shared knowledge base of the organization;
- Tags: tagging content and over time creating a "tag cloud" showing related interests within the user community;
- Extensions: automating the categorization and pattern matching to enable people to find related knowledge;
- Signals: a way of alerting people that something potentially of interest to them becomes available.

It places emphasis on how tools generally meant for personal or collaborative use on the Web, such as blogs or wikis, can be part of corporate information systems. The challenge organizations face today is the ability to provide the right information to the right people at the right time. So it is not the production of information and knowledge that creates a problem but the sharing and discovery in the information space. In order to create a successful model, it

is necessary to think about the content organization or indexing practices that will enable successful knowledge management across various platforms, among various entities, repositories and traditional information spaces.

2. KNOWLEDGE MANAGEMENT IN THE CONTEXT OF WEB 2.0

There have been discussion about the functionality of the knowledge management and whether we have implementations of knowledge management or information management it is true that there are three major aspects governing the knowledge management field: technology, information management and human resources. We are not going to discuss the validity of managing knowledge captured in human minds but focus on the knowledge sharing aspects which have find their place in the nature of the web 2.0 philosophy.

For any information platform to be valuable, its users must be able to find what they are looking for. Sharing knowledge is one of the key processes of knowledge management. Growing popularity of social software has created a disperse environment of knowledge sharing and representation demanding the transformation from the traditional centralized and paper or paper like oriented environment. Traditional environments or Enterprise 1.0 is based on memos and e-mails, complex workflows and publishing procedures with single entry point being more rejective than work productive. The Enterprise 2.0 with its collaborative nature and utilizing services such as wikis, social bookmarking, collaborative filtering and social networking encourages knowledge sharing and collaboration.

According to Passant *et al.* (2007) there are three main issues of Enterprise 2.0 ecosystems research and development: information fragmentation and heterogeneity of data formats; knowledge capture and re-use; and tagging and information retrieval. Information fragmentation and heterogeneity is not a new problem typical for new collaborative environment, as it is the case that data and knowledge is dispersed around various sources in the company, but is strengthen by the implementation of various social platforms and data heterogeneity. Capturing knowledge on various platforms such as wikis or blogs poses a problem for knowledge discovery and reuse and requires good data mining procedures and defined indexing policies. Furthermore, authors suggests solutions of creating interoperability between heterogeneous Web 2.0 applications in the enterprise; knowledge capture – by bridging the gap between documents and data; and better information browsing and querying via additional applications using machine-readable and structured data. One of the solutions for a knowledge management in such a disperse business environment is the implementation of folksonomies and their mapping to the traditional knowledge organization tools or semantic implementations such as ontologies.

3. EMERGENCE OF COLLABORATIVE TAGGING — FOLKSONOMIES

The indexing of information resources is traditionally perceived as a two-step process: content analysis, which describes the content of the resource; and the allocation of term according to the first step and translation of those terms in some form of controlled vocabulary (Peters, 2009). Following the development of World Wide Web, available resources and information have become increasingly available, which called for development of suitable indexing methods. Initial attempts tried to transfer categorization methods from libraries, by creating different web catalogues of online resources (e.g. Open Directory project) or propose certain simple metadata sets for description (such as Dublin Core), but those efforts yielded sparse results. The fast growing Web made web catalogues out of date and obsolete for both indexing and searching purposes, while the lack of central quality control prevented the Dublin Core success (Peters, 2009). With the rise of Web 2.0, a new wave of user participation in creating and describing online resources instigated a new approach in knowledge representation – folksonomies. Folksonomies rely on the process of collaborative tagging, described as: "the process by which many users add metadata in the form of keywords to shared content" (Golder and Huberman, 2006), where the totality of these added tags on any different platform forms a folksonomy. The term itself was coined from the words *folk* and *taxonomy* denoting the aspect of user participation in the knowledge organization process (Vander Wal, 2005), but the adequacy of the term is still a subject of debate (Mathes, 2004).

The structure of folksonomies can be generally viewed through three different aspects: (1) *tags* – freely chosen user keywords that describe the resource; (2) *users* – those that perform the indexing, and (3) *resources* – items being indexed (Marlow et. al, 2006).

Although tagging can be understood as a method of indexing, according to Peters (2009), folksonomies represent a "weak" method of knowledge representation because they don't have means to express semantic relations as traditional methods of knowledge representation such as classifications, thesauri or ontologies have. Because of these drawbacks, many authors advocate the use of folksonomies as a complementary method of knowledge organization by using power tags extracted from folksonomies along with controlled vocabularies (Yi & Mai Chan, 2009; Mendes, Quiñonez-Skinner and Skaggs, 2009). In this notion, folksonomies are useful for providing user warrant, i.e. ensuring that the subject description matches the user vocabulary. This is where folksonomies add new values to subject approach because they provide additional access points to the resource itself and can enhance the quality of browsing methods for users that don't have a clear notion on what they are looking for, especially when dealing with non-textual resources (Mathes, 2004; Quintarelli, 2005; Kipp and Campbell, 2006; Kellog Smith, 2011). Therefore, such hybrid approaches are considered to be the best way in which folksonomies can be implemented in the field of subject approach to information in the online environment

4. FOLKSONOMIES IN THE BUSINESS ENVIRONMENT

The concept of tagging reinforces the fact that the web is no longer a storehouse for static content with passive users. It is now used to connect users from disparate locations with common interests. The benefits of personal tagging are generated by the value that is created when connections take place (Parise et al., 2009).

Folksonomies contain individual's structural knowledge about documents. A person's structural knowledge has been defined as the knowledge of how concepts in a domain are interrelated (Diekhoff and Diekhoff 1982). In a collaborative tagging system, tags codify the knowledge of relationships among documents and concepts represented by the tags. Harvesting individuals' knowledge through folksonomies therefore can benefit the whole society. Tagging begins as a personal information management and re-discovery tool. New concepts often emerge in personal tags that are then shared in social systems, where social information discovery leads new users to content (Trant, 2009).

There is tremendous value that can be derived from this personal tagging when viewing it as a collective when you have the three needed data points in a folksonomy tool: the person tagging, the object being tagged as its own entity, the tag being used on that object. Keeping the three data elements you can use two of the elements to find a third element, which has value (Vander Wal, 2005). In folksonomies we are confronted with three different aspects (Marlow et. al, 2006): the documents to be described, the tags (words), which are used for description, the users (prosumers), who are indexing. This creates a good environment for knowledge sharing and what knowledge management tries to do.

Johnston (2007) based on the review of the literature gives an overview of the different approaches to implementation of folksonomies in business environment, mainly in improving connection with its customers. First is an approach by which define service semantics in which modeling is incrementally refined by the users and not the originator; second, implementation of folksonomies to build customer-centric classifications of business services. Lastly, folksonomies could be used in connecting and testing new products, concepts and services in researching user tags added to new product or use it for the early buzz around new product.

How folksonomies support knowledge sharing and development of communities of practice and in the end knowledge management is presented in works of Ohmukai, Hamasaki and Takeda (2005) and Beckett (2006). First one reports a design for a system that enables users to position their tags [and bookmarks] alongside those of others in their personal network, enabling the construction of a community-based ontology, and include a proposed RDF expression of the model. Beckett (2006) offers a method for using wiki-space to disambiguate and structure tags into meaningful semantics.

So to summarize, folksonomies in enterprise can be utilized for tagging external links or internal links where individuals can see

other colleagues interest or share links with the project team, track trends or various research, etc. Furthermore, there are social aspect of identifying, connecting, collaborating and sharing of resources, information and knowledge; and improving information sharing and retrieval where tags are used to improve and update taxonomies.

5. FOLKSONOMIES AND TRADITIONAL KNOWLEDGE ORGANIZATION TOOLS

Folksonomies are often seen as the bottom-up approach, while formal knowledge organization tools such as taxonomies, classification schemes, thesauruses and ontologies are considered to be necessarily a top-down approach (Bresslin, Passant and Decker, 2009). A folksonomy is hence a social, collaboratively-generated, open-ended, evolving and user-driven categorisation scheme. Taxonomies and controlled vocabularies work by establishing a clear view and organization of the corpus on which users have to agree in order to use the classification scheme properly (Wiley, 2011). Tagging represents an action of reflection, where the tagger sums up a series of words into one or more summary tags, each of which stands on its own to describe some aspect of the resource based on the tagger's experiences and beliefs (Bateman *et al.*, 2007). Traditional organization is information or knowledge centred and the Enterprise 2.0 is people or social centred.

Goal of each individuals tagging procedure is not in creating a reusable folksonomy but creating a tool for knowledge organization or personal knowledge management within their project. Because of the open and dynamic nature of the projects, nobody is responsible for the full tagging terminology. This makes centralized approaches to enrich the folksonomy difficult. Additional mapping and linking needs to be done in order to enable information or content searching, navigation and discovery and facilitate collaborative opportunities for knowledge management. Using a sound and complete classification scheme requires professionals to do the job, a common clear view of the domain and skilled users that understand the categories and the structure of the classification to use it without problems (Quintarelli, 2005). Folksonomies are inherently open-ended and therefore respond quickly to changes and innovations in the way users categorize content. Peterson (2009) argues that maintaining the goal of neutrality is a significant reason to prefer controlled classification.

The major difference between taxonomy and folksonomy is in that taxonomies provide controlled top-down approach while folksonomies preset democratic bottom-up approach. Secondly, taxonomies are accurate, restrictive and static while folksonomies are flexible, evolving and in-time. Regarding the manpower and financial input, taxonomies are expensive to maintain and present arduous process, while folksonomies are low cost, crowd sourcing and easy going. Folksonomies can be redundant, have no language control, varying levels of granularity and lack consistency, but on the other hand, their main advantage is that they reflect the information structures and relationships that people actually use, instead of the ones that were

planned for them in advance, as is the case of taxonomies. Therefore, research tends to combine the best aspects of both worlds. Bresslin, Passant and Decker (2009) list numerous works related to the links between tags, related objects (tagging actions, folksonomies, tag clouds, etc.) and the Semantic Web published during the last couple of years. Weller and Peters (2008) suggest method for manipulating and organizing tags in folksonomies calling it tag gardening. The idea is in finding the best solution of combining both worlds of indexing in bringing together advantages of each of the vocabulary types i.e. combining folksonomies as an uncontrolled vocabulary with the controlled vocabularies. Macgregor and McCulloch (2006) state that the need for lexical control, hierarchical structure and associated coding is essential for attaining meaningful subject interoperability across distributed systems, as well as maintaining the efficacy of subject searching on local systems.

Regarding the methods to improve usage of folksonomies in knowledge management there are various approaches that could be implemented for successful knowledge organization and management in companies and their enterprise 2.0 environments. Limpens, Gandon and Buffa (2008) give an overview of the body of literature and research approaches, discussing the research in structure and enriching of folksonomies. The structure in folksonomies based on the body of research: building lightweight ontologies (Mika, 2005; Lux and Dsinger, 2007) and clustering and mapping with ontologies (Specia and Motta, 2007; Angeletou et al., 2007). The first approach is based on creating semantic relationships between the tags and is based on the philosophy of user warranty in controlled languages. Second approach proposes grouping tags into clusters and mapping these tags to concepts found in ontologies available on the Semantic web. This enables to map the concepts and their properties to the tags. The result is a set of clusters of tags enriched with semantics. Furthermore, Limpens, Gandon and Buffa (2008) discuss different approaches to enriching folksonomies such as using the tags as attributes of the concepts of an ontology Passant (2007), or they reify the tags themselves by creating an "ontology of folksonomy" Gruber (2005), allowing to get richer metadata from the tagging activity. Lemieux (2009) suggests four hybrid approaches to taxonomy and folksonomy: co-existence, folksonomy-directed taxonomy, taxonomy-directed folksonomy and folksonomy hierarchies/ ontologies. Lin, Davis and Zhou (2009) propose a data mining approach to extract ontological structures from folksonomies.

Social tagging has been evolving different strategies to reduce ambiguity, enhance consistency and create meaningful and useful patterns for its users. The body of research aims to either define, mine or automatically link folksonomies to thesauruses, taxonomies or ontologies. Offered solutions could be defined as hybrid approaches in combining taxonomy and folksonomy in four different modes: co-existence, tag influenced taxonomy, taxonomy influenced tags and tag hierarchies/ontologies. The result of different research shows that in order to have a successful information or knowledge management model compliant with the advancement of web technology we need to have a good correlation and integration of different tools.

CONCLUSION

Enterprise 2.0 describes the use of emergent social software tools to improve knowledge sharing and collaborate within and between firms, their customers and partners. The benefits of employing Enterprise 2.0 in an organization are in information access which enables employees and other stakeholders to access relevant, timely and up-to-date information in an anytime anywhere mode. The question that arises is how to implement successful knowledge management in such a disperse environment where content is spread on various platforms. Centralized indexing, as known in traditional Enterprise 1.0, is not a viable method.

So the question is how we can combine these two approaches in creating a base for the new knowledge organization models. Therefore, we need to first ask ourselves: are folksonomies a base for new knowledge organization models and tools information specialist need to develop and adapt in order to make knowledge sharing and discovery easier and more efficient? Although folksonomies are approach that responds to the new web 2.0 environment and is slowly penetrating the knowledge organization and management area. There are still some major problems mentioned earlier in discussion of folksonomies. In the context of knowledge management and business environment, there are some major issues in using folksonomies instead of taxonomies. First and foremost is the flatness or lack of semantic connections, than, the ambiguity of tags, spelling variations, usage of different languages, or the lack of explicit representations of knowledge contained in folksonomies and the lifecycle of folksonomies. These are just some of the raised issues that create problems in sharing and using documents and items indexed only with folksonomy. On the other hand, creating parallel indexing approaches complicates things and creates confusions. Therefore, in supporting successful knowledge management system combined approach needs to be implemented. Otherwise, knowledge organization in Enterprise 2.0 will not be sustainable and preserved over longer time period or usable in the world wide company setting.

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