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► **To cite this version:**

Pascal Pecquet, Sahbi Sidhom. Editorial Concepts and Tools on Knowledge Management: factors that organize knowledge and phenomena that affect the information society A special issue of e-JDE on Knowledge Management to design the best strategies process. , 37 (1-2), pp.300, 2014, special issue of e-JDE on Knowledge Management to design the best strategies process, Pascal Pecquet, ISSN 1776-2960. hal-01109152

HAL Id: hal-01109152

<https://inria.hal.science/hal-01109152v1>

Submitted on 24 Jan 2015

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Editorial

Concepts and Tools on Knowledge Management: factors that organize knowledge and phenomena that affect the information society

A special issue of e-JDE on Knowledge Management to design the best strategies process

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He is the founder and president of two international projects: the SIIE project, as international conference on "information systems and economic intelligence" (www.siiie.fr) and the ISKO-Maghreb project, as ISKO chapter in the Maghreb countries on "concepts and tools for knowledge management (KM)" (www.isko-maghreb.org).

Introduction:

This special issue of the Electronic Journal of Digital Enterprise (e-JDE), on Concepts and Tools for Knowledge Management (KM), develops the argument that the governance of knowledge seems to be the Scientific Policy able to creating value with regard of human and its evolution in cultures and civilizations. The duty of good governance is a consideration of the transfer of knowledge related to scientific and technological progress. Intrinsically, this process requires a system of organization and knowledge management by implementing knowledge production and its influence in society.

The objective of the ISKO-Maghreb Chapter is to contribute in understanding the factors that organize knowledge and phenomena that affect the information society. Actions to be undertaken by the scientific ISKO society must take into account socio-cultural, cognitive and economic in the strategic management of knowledge. Towards the knowledge society, it should be seen in its dynamic, its content and its interaction with science and technology associated to universities, companies and politics.

In this context, a first orientation is pedagogical attempt to answer the question "what is known about the knowledge and its organization?". Then the issue is moving towards the societal issues of knowledge, theory and practice, to provide clarification to a convergence of KM (Knowledge Management) approaches. Education, science, culture, communication and technology remain the major themes covered by ISKO-Maghreb, for the development of the knowledge organization, expertise management and collective intelligence.

Papers' Contribution to this Issue:

Paper 1 in English:

Nouha Taifi, from (Industrial Engineering Department, Mohammadia School of Engineering, University Mohammed V - Morocco), presents the **“Strategic and Technological Aspects of Institutional Change: Engineering of a new mindset of Information and Knowledge Management Systems”**.

The document here argues that most institutional change of human resources has the objective of careers and collaborations development. This should be though accompanied by optimal information and knowledge management systems in order to allow a zero-trauma change to human resources because institutional change mean the integration of new organizational forms, new coordination mechanism and value chains. The objective of this contribution is to investigate on this new mindset calling for the engineering and development of information and knowledge management systems that are focused on the enhancement of inter-organizational collaboration, networking and integrated-systems. The paper presents a research agenda for the identification of the strategic dynamisms of institutional change leading to the creation of the new mind set and its information

and knowledge management systems that are leading to more freedom in knowledge sharing and access.

This research try in first to identify the reasons behind institutional change, then analyze more clearly the challenges and issues occurring as a result of the change. So, the research frames the following question: *What are the challenges faced during institutional change?* In second, from a strategic perspective, the research would like to investigate on the solutions that can be adopted to integrate easily human capital in their new positions. So the research frames the following question: How can human capital be integrated in new positions following an optimal process? In third, assuming that one of the key success factors is information communication technologies; the research investigates on the types of IT-systems that can contribute majorly to the success of institutional change. So, the research frames the following question: What types of IT-solutions can lead to 'zero trauma' institutional change? Finally, the research aims at the identification of the potential impacts of its devised strategic and technological solutions and methodologies. So, the research frames the following final question: What are the differences among institutional change with the strategic and technological solutions and without?

In application, this research presents various types of scientific approaches linked to mathematical concepts, information and communication technologies concepts and network approaches.

* Paper 2* in English:

Khaled Gaaloul, Marwane El Kharbili and Henderik Proper, from ((Public Research Centre Henri Tudor - Luxembourg, University of Mluxembours, Luxembourg), present the "**Secure Governance in Enterprise Architecture - Access Control Perspective**".

Authors argue that in Enterprise Architecture (EA) models have proven to be very useful for the management and governance of enterprises. Such EA models are used for analysis and steering purposes, thereby leading to a competitive advantage for the enterprise. However, the management of EA model evolution from an initial (As-is) to a posterior (To-be) state is a challenging task for EA modelers, due to the huge number and the complex dependencies amongst models.

In this research, authors tackle the challenge of a controlled evolution of EA models which seeks to give more control to EA modelers over what the impact of EA evolution means in terms of properties (e.g. security) of the EA. We propose a core knowledge model for representing EA evolution which supports the EA modeler in deciding about the (To-be) model compliance. The proposed model is based on the three notions of change operation, artifact-to-artifact dependency, and reactive event-conditionaction (ECA) rules. We instantiate our approach for the case where security properties must be maintained through EA evolution.

In application, authors propose a solution to be able to decide whether an EA evolution is suspicious or compliant. They do this by relying on three notions: change operation, dependency, and event-condition-action rules. In the following, they concisely explain how these three elements are combined to propose a solution to govern EA evolution: First of all, they define a knowledge model as a set of operations of various kinds (adding, deleting, modifying, replacing elements) on artifacts occurring in an EA model. In second, dependencies are basically relations stating that any operation

executed on an artifact respectively model shall have probable repercussions on another artifact respectively model.

* Paper 3* in French:

Karel Soumagnac and Anne Lehmans, from (IUFM, Université de Bordeaux - France), discuss on the « **Classement, indexation et rangement de ressources partageables dans une communauté de pratique ouverte : le cas de l'écoconstruction** ».

Pour les auteurs, les communautés de pratique dans des domaines qui ne disposent pas d'un écosystème informationnel structuré et institutionnalisé sont confrontées à la question de la gestion des connaissances en l'absence de médiation professionnelle et d'organisation. La diversité et l'hétérogénéité des documents et informations dont ont besoin leurs membres pour exercer leur activité questionnent le travail de rangement qu'ils peuvent ou doivent mettre en place. Le problème rencontré par la communauté de pratique des écoconstructeurs est leur isolement, le fait qu'ils travaillent sur la prise en compte de la complexité en s'intégrant dans une démarche de développement durable, mais qu'ils n'ont pas de moyens matériels, culturels, temporels, techniques, pour exploiter l'information indispensable à leur activité. On s'interroge sur la façon dont ces professionnels peuvent effectuer les choix de rangement de ces ressources pour qu'elles soient partageables au sein de la communauté, et sur les moyens de les aider dans cette construction en leur proposant des principes d'organisation à partir d'une enquête sur leurs pratiques informationnelles.

En application, la réflexion des auteurs a conduit sur les principes de rangement de l'information et des ressources dans une architecture visant le partage et la coopération. L'effort s'incarne dans des propositions de principes d'organisation pour la construction d'un site, portail de veille informationnelle (en cours de construction). Après avoir défini les caractéristiques nécessaires à cette architecture, les auteurs proposent quelques pistes d'organisation sur : l'« Organisation de la confiance informationnelle » et les « Principes directeurs d'une méthodologie de classement ».

* Paper 4* in English:

Badrina Gasmî and Hassina Nacer, Nacer Boudjlida, from (University of Béjaïa, Algeria and Lorraine University - France), focus the study on "**Competence Discovery and Composition**".

In development, the capture, the structuring and the exploitation of competences of an "object" (like a business partner, an employee, a software component, a Web service, etc.) are crucial problems in various applications, like cooperative and distributed applications or e-business applications. The work concerns competence advertising, organization, discovery and composition. Indeed, one of the originality of the proposal is in the nature of the answers the intended system can return when seeking for individuals fitted with given competences: answers may be composite ones in that sense that when no single object meets the search criteria. Authors attempt to find out what a set of objects, when pooled together, do satisfy the whole search criteria. Conceptual Graphs (CGs) are used as a knowledge representation formalism and operations on graphs are used as a search

mechanism. A client/server prototype, viewed as a federation of mediators, has been developed as a proof of concept.

For an experimental validation of the proposed approach, authors implemented a prototype using many software components. There exist several tools which implement CGs in particular for research purposes and for information extraction [26]–[29]. However, few of these tools offer a complete software environment for the widest possible use of the model: the storage and the manipulation of a large number of graphs. For that reason, authors choose to use the CoGITaNT library (Conceptual Graphs Integrated Tools allowing Nested Typed graphs), a library of C++ classes (open source, developed at LIRM Montpellier, CNRS, France) which allows developing applications based on the CG knowledge representation scheme.

* Paper 5* in English:

Samia Drissi and Abdelkrim Amirat, from (University Mohamed Cherif Messadia, Souk Ahras, Algeria), present an “**adaptive e-learning hypermedia system: design and evaluation**”.

Authors argue that learning style is one of the individual differences that play an important but controversial role in the learning process. In a previous research, they suggested that learning styles significantly affect student learning because they refer to how learners process and organize information. To this end, this research presents an approach to integrate learning styles into adaptive e-learning hypermedia. To achieve the main objectives, a case study was developed. An experimental evaluation was designed to evaluate the new approach of matching learning materials with learning styles and their influence on student's learning achievement.

In application, authors are interested in hypermedia documents as a field of study. Hypermedias consist of nodes and links. their interest focuses on the adaptation of content pages (adaptation of the presentation) and links using first scheduling technique that focuses on ordering the links according to their relevance to a given learner following the cycle of experiential learning, and secondly the annotation links whose principle is to add comments to various links to indicate the learner the content of the page that is accessed by the link.

* Paper 6* in English:

Marwen Jabloun, Yemna Sayeb and Henda Ben Ghezala, from (RIADI-GDL Lab, University of La Manouba, Tunisia), focus their research on “**Ontologie d’entreprise orientée compétence : support à l’urbanisation des systèmes d’information**”.

Authors argue that the urbanization of information system (U.I.S) is a fairly complex process because like all EA approaches around the world, it is based on a layered representation. In the context of modeling the EA layer is a point of view as a strategic, business, technical point of view etc. In addition, the information system (I.S) is not just a technical challenge, focused on information and IT support systems. On the contrary, everything indicates that the key issues within the organization

and the human factor in business as well as their competence. So taking into account the changes in the organization is critical to the success of urbanization projects. Thus, organization models have been developed in the context of enterprise architecture (EA). These models aim to structure a holistic view of the enterprise. However, a semantic deficit was identified by several researches in these models. So, several studies have investigated to solve this problem by proposing ontologies as a semantic enrichment tool. Based on these works we built an ontology that aims to support the process of change in an UIS approach.

Authors present in a first part the different ontologies developed for the company and in the second part we present a modular ontology oriented competence exploitable in the context of UISI. Then in the end they present the technical way to use this ontology.

In application, the ontology to support the U.I.S is developed in a global context of EA. Authors think that the knowledge's core of a complex domain may be reduced to a pair of meta model and ontology. In addition to that, the interest on the actor concept and competences can increase the possibility of ensuring the alignment between the various components of an IS.

* Paper 7* in Franch:

Noureddine Bourkache, Sahbi Sidhom and Mourad Laghrouche, from (LAMPA, FGEI, UMMTO University, Algeria & Lorraine University & LORIA (Kiwi), France), present their research on « **Apprentissage numérique pour la recherche d'informations en imagerie médicale : Modélisation des filtres de Gabor** ».

Les auteurs proposent une méthode d'indexation et de recherche d'images en exploitant le contenu numérique des images. Cette méthode est fondée sur la représentation du contenu numérique de l'image par un vecteur de caractéristiques propres à l'image indexée. Ce vecteur sera appelé : signature numérique de l'image. Pour ce faire, il est question d'exploiter la texture de l'image en utilisant les ondelettes de Gabor. Dans ce travail, chaque image de la base d'apprentissage est indexée et représentée par ses caractéristiques (texture). Cette représentation, qui s'effectue en offline, est caractérisée par la sauvegarde, dans une base de données, de toutes les signatures des images indexées. Ce qui permet, en online, d'effectuer une recherche de similarité numérique par rapport à une image requête. Cette même image requête sera indexée en online avec le même algorithme utilisé en offline. Afin d'évaluer les performances nous avons testé notre application sur une base d'images d'apprentissage contenant 320 mammographies. Les résultats obtenus montrent bien que la représentation du contenu numérique des images s'avère important en matière de recherche d'information en imagerie.

En expérimentation, une première partie de ce travail a consisté à caractériser l'image par une signature numérique représentant ses aspects morphologiques. Dans l'approche, en deuxième partie, l'architecture développée a permis de modéliser le système d'indexation et de recherche d'image par le contenu en utilisant principalement les filtres de Gabor. Il s'agit d'une méthode numérique complexe et qui fait preuve de pertinence dans l'apprentissage par les vecteurs caractéristique de l'image (ou filtres de Gabor). Or le système est insensible à la rotation et même à

la translation. Dans ce cas, si une image cible soit proche de la requête par son contenu, même si elle subit une rotation ou une translation, le système la retrouve avec grande précision.

* Paper 8* in English:

L. Verlaet and S. Gallot, from (LERASS-Céric (EA-827), Université Paul Valéry, France), present their research work on **“Hypermediating sites : towards new forms of technology intelligence ? Between collective intelligence and semantic web”**.

Authors contribution in this research is focused on the presentation of a new access form to knowledge through the concept « hypermediator websites ». These hypermediator sites are intermediate between information devices that just scan the book culture and a “real” hypertext writing format.

The particularity of the chosen approach is to apprehend, process and analyze the corpus. Indeed authors try to adapt the analysis tools generally used to study situations and communication systems between social actors in order to transpose them to their writings and products of their knowledge. In context, the hypermediator website is based on the markup model by the Semio-Contextual Approach of Corpus (SCAC), model formulated from an approach through information contextualizing: semiotic context analysis (Mucchielli, 2005) which is a method of contextual and cognitive analysis of communication situations.

In application, authors support the idea of going back to the source, to the organization of the system of thought, "communication" of knowledge and ideas, and to the construction of meaning as an iterative process of knowledge construction. In addition, they consider that the organization of knowledge, knowledge construction is part of a process of knowledge modeling. In context, authors argue that information visualization as an "artificial" model close to intra-psychic processes intending to organize knowledge, to formalize the relations between knowledge offered in a non-sequential manner but through a network and taking into account links, relations between the different meaning units, in order to navigate through the content without losing the fundamental idea of constructed meaning.