Knowledge Maps & Knowledge Mapping: Literature Review

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Abstract

This study provides information about Knowledge Mapping as a tool of Knowledge Management, how it is used and how do we "occasionally" use it daily. Main part of this paper focuses on the relation among an organisation and knowledge mapping, and how k-maps are important and what's their purpose. After a broad analysis of articles from nowadays significant researchers about knowledge mapping I was able to extract the main issues, statements and definitions on knowledge mapping and what would help an organisation in its strategic positioning and development in the manner of k-maps. Moreover, where to focus on, in the need of preparing a knowledge map. Also, which k-maps developed throughout the time and their difference among each other?

Keywords: Knowledge Mapping, Knowledge Management, Organisation, Strategic Positioning

1. INTRODUCTION

Knowledge is an accepted and significant base for competitive advantages and companies started to establish new smart information system. One of the key processes in Knowledge Management is Knowledge Mapping. The main use of knowledge maps is to get an outline about the available sources of information and to help in finding appropriate sources quickly. So therefore a source can be expertise, knowledge, a person, etc. In order to apply any knowledge mapping technique, an organization must be sure of its success and efficiency. A basis to identify the level of knowledge of an organisation could be the knowledge map which also can support the strategic positioning in terms of knowledge management. In an organisation one of the most important goals is the expertise location. In this expertise mapping the organisation's knowledge needs to be inventoried as well as to map the organisation's information flow. The common approached to achieve this are assessment of interviews, abilities records and extensive surveys and analysis.

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"Knowledge mapping is a process by which organisations can identify and categorise knowledge assets within their organisation - people, processes, content, and technology. It allows an organisation to fully leverage the existing expertise resident in the organisation, as well as identify barriers and constraints to fulfilling strategic goals and objectives. It is constructing a roadmap to locate the information needed to make the best use of resources, independent of source or form".43

Knowledge Mapping in not a term that is new, in fact we all are practising knowledge mapping throughout our whole and everyday life. The only difference is that we are not writing/drawing it down and we are not doing it systematic. So basically knowledge mapping is having a record of information and knowledge we need like where we can get it from, who holds it, whose expertise is it, and so on. A good example would be our home. When we need to find something that we need and which is in our home it would be easy and fast to find it because we have almost all information and knowledge about "where is what" and "who knows what" at our home. This map which is about our home and which in our mind it is always updated, therefore we are able to act quickly and precised. But of course to have such a "mind" map about our organisation and organisational knowledge would be impossible. Since there is too much information and many individuals included. This is where knowledge mapping comes to action and shows us details of every knowledge that exist in the organization containing information about location, quality, and accessibility; and all the knowledge which is required to run the company smooth, means it enables us to find the knowledge we need easy and efficiently.

It is important to note that the main aim of knowledge maps is not to create new knowledge but to structure and provide an easy access to knowledge which already available within the organisation. To find out and assess the knowledge assets of an organisation and make the organisation have maximum benefits from these assets.

2. Additional Definitions of Knowledge Mapping

"Knowledge mapping is a process of surveying, assessing and linking the information, knowledge, competencies and proficiencies held by individuals and groups within an organization."44

- Dr Ann Hylton, KeKma-Training 2002

"It's an ongoing quest within an organization (including its supply and customer chain) to help discover the location, ownership, value and use of knowledge artifacts, to learn the roles and expertise of people, to identify constraints to the flow of knowledge, and to highlight opportunities to leverage existing knowledge. Knowledge mapping is a important practice consisting of survey, audit, and synthesis. It aims to track the acquisition and loss of information and knowledge. It explores personal and group competencies and proficiencies. It illustrates or "maps" how knowledge flows throughout an organization. Knowledge mapping helps an organization to appreciate how the loss of staff influences intellectual

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43 Vestal, Wesley. "Knowledge Mapping 101". Presentation at USAID Knowledge for Development Seminar September 22, 2003. http://pdf.usaid.gov/pdf_docs/PNADK308.pdf

44 "U.S. Agency for International Development." U.S. Agency for International Development. Web. 15 May 2012. <http://www.usaid.gov/>.

capital, to assist with the selection of teams, and to match technology to knowledge needs and processes."45

- Knowledge Mapping: A Practical Overview by Denham Grey March, 1999

"Knowledge mapping is related to making knowledge that is available within an organisation translucent, and is about giving you the insights into it's quality."46

- Willem-Olaf Huijsen, Samuel J. Driessen, Jan W. M. Jacobs

"Knowledge mapping externalizes networks of cognitive relationships and renders them in graphic form. This pictorial approach to individual or group knowledge assists in the formation and maintenance of shared mental models and streamlines collaboration. Knowledge maps are commonly referred to as mind maps, semantic networks, and concept maps."47

- Jonassen, D. H., & Carr, C. S. (2000) & Novak, J. D. (1998)

"A knowledge map is a presentation of one or more aspects of the knowledge available within an organization that aims to fulfill a specific information need for one or more employee roles within the organization."48

- Driessen, Huijsen and Grootveld

To sum up all the definitions, knowledge mapping is a process and an approach to information that can be applied to any area that requires knowledge; it can also be used in specific circumstances such as implementing technological modification, preparation for an acquisition, introducing a new policy, or mapping intellectual capital.

3. Knowledge Mapping: Where to Focus?

3.1 Strategic

3.1.1 Enterprise-level

Strategic business, technical, market knowledge

Determine the organization's "bench strength"

Identify areas to focus KM efforts

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45 "Knowledge Mapping: A Practical Overview." : Impact Alliance. Web. 15 May 2012. <http://www.impactalliance.org/ev_en.php?ID=2011_201>.

46 "Thoughts.com." Where Is the Map? 3 Easy Steps to Construct a Speech. Web. 15 May 2012. <http://www.thoughts.com/colbygross511/where-is-the-map-3-easy-steps-to-construct-a-speech>.

47 "Definition: Knowledge Mapping." Definition: Knowledge Mapping. Web. 15 May 2012. <http://technologysource.org/extra/83/definition/2/>.

48 "Mapping the People in Your Organisation." Mapping the People in Your Organisation. Web. 15 May 2012. <http://www.moxy.com.au/index.php/moxy-knowledge/18-articles/60-mapping-the-people-in-your-organisation>.

3.1.2 Cross-functional between divisions/business groups

Operational assessment of working knowledge

3.2 Tactical

Working group/process

Tactical and operational knowledge applied to process excellence, innovation, customer relationship

- USAID, 2003

4. Classification of Knowledge Maps

4.1 Through classification of knowledge maps many advantages can be achieved:

A descriptive overview (which can function as an inventory or repository)

A problem solving heuristic (that relates possible mapping solutions)

Reduces the complexity characteristic (in choosing a knowledge map format)

Recognition of similarities and differences (among different types of knowledge maps)

To compare (different knowledge maps)

May reveal new forms of knowledge maps (which are not applied yet)

4.2 Through classification of knowledge maps many disadvantages may appear:

- Focus on description, instead of explanation
- Reification (pretending that an ideal archetype does exist)
- Static (difficult to adjust as a domain changes and evolves)

Due to these disadvantages it is recommended that the classification system should rely on more than just one classification principle and should suggest various, alternative classification criteria. A classification should minimize the differences within a group and maximize the differences between groups.

Knowledge maps are classified by:

- Purpose
- Graphic Form
- Content
- Application Level
- Creation Mode

Furthermore, according to this it can be classified in questions forms:

1. Which knowledge management purpose do I want to achieve with the map? (The "why?" of the map.)
2. Which kind of content about knowledge do I want to represent in the map? (The "what?" of the map.)
3. Who should use the map in which context or situation and at what level? (The "for whom?" and "when?" of the map)

4. Which graphic form should be used and who can create the map in what way? (The "how?" and "who?" of the map)

So basically knowledge maps differ themselves in the usage of why, what, for whom, how and who wants information and to whom we want to transfer it. Therefore, their limitation lies in that that we can't mix them, even there are some possibilities. But they are limited by the purpose and how we want to transfer our information and knowledge throughout an organisation. In the next two pages you will be able to see 2 tables.

Table 1 shows sample knowledge maps types based on these primary classifications. Table 2 deliberates on which kind of knowledge map may be useful for a given knowledge management process or challenge. Those two tables were taken from the research article from Martin J. Eppler, A process-Based Classification of Knowledge Maps and Application Examples.

5. Conclusion

Since a knowledge map gives you information of knowledge and information within your organisation, IBU would benefit from a knowledge map. It would have fast access to many information about the students, professor, grades, etc and IBU in total.

It would be an easy effort to see which students are visiting/joining IBU. Which nationality, age, previous education, gpa, etc they have; also the progress of the students throughout their education. As well as the satisfaction of students about the professors, grade overview of all of them, etc.

We would be able to see which quality IBU is offering, what kind of professor they have. Who has a phd or master title, where they taught before, etc.

All this would be beneficial to IBU but I think that every university should and must have a regularly updated knowledge map. But I think that IBU already have some kind of knowledge map due to its regularly surveys which are offered to students.

Knowledge Map Classification

A. Classifying knowledge maps by intended purpose or KM process (''why?'')

1. Knowledge creation maps: illustrate the planned steps to develop a certain (organizational) competence or create new knowledge (i.e., a technology road map)

2. Knowledge assessment or audit maps: illustrate the evaluation of certain knowledge assets graphically, for example, by a 2 x 2 matrix (axes: current ability and future importance)

3. Knowledge identification maps: provide a graphic overview on knowledge assets (experts, patents, practices) and points to their locations/coordinates

4. Knowledge development or acquisition maps/learning maps

(a) Learning overview and learning path maps

(b) Learning content structure maps

(c) Learning reviewing/repetition maps

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5. Knowledge transfer, sharing, or communication maps: show who transfers knowledge to whom

6. Knowledge application maps: show which knowledge is necessary for carrying out certain processes or steps in a single process

7. Knowledge marketing maps: can be used to signal competence to the public in a certain domain

B. Classifying maps by their content (''what?'')

I. By (digital and analog) content formats: 1. websites (incl. blogs, portals, homepages), 2. documents

(incl. books), 3. databases or repositories, 4. learning objects or online courses (or modules),

5. other file formats (e.g., sketches, drawings)

II. By content types: 1. methods, 2. processes, 3. experts (incl. groups), 4. organizations/departments/ institutions, 5. lessons learned/experiences, 6. skills and competencies, 7. concepts, 8. events, 9. patents, 10. knowledge or communication flows or relationships, 11. interests or knowledge needs

C. Classifying maps by the application level (''who?'')

1. Personal knowledge maps (visualizing one's own skills or expert contacts, see Eppler and Sukowksi, 2000 or Burnett et al., 2004)

2. Dyadic knowledge map (to support knowledge creation, transfer, or assessment between two people)

3. Team knowledge maps (visualize the skills present or needed in a project team, like the T-matrix, see Eppler and Sukowksi, 2000)

4. Departmental knowledge maps

5. Community knowledge maps

6. Organizational knowledge maps

7. Inter-organizational/network knowledge maps

D. Classifying knowledge maps by graphic form (''how?'')

I Table-based format (for an example see Heng, 2001)

1. Person by skills table

2. Skill area by people table

3. People by documents

4. Team by project experience table

II. Diagrammatic format

1. Structure diagrams

(a) Venn diagram, (b) concentric circles (with or without segments), (c) matrix (i.e., 2 x 2), (d) network diagram, (e) mind map, (f) concept map (Tergan and Keller, 2005),

(g) cognitive map (Huff and Jenkins, 2002), (h) strategy map, (i) fishbone

2. Process diagrams (Galloway, 1994)

(a) Timeline, (b) swim lane chart, (c) flow chart, (d) event chain, (e) critical path method,

(f) Gantt chart, (g) cycle chart, (h) decision tree, (i) value chain, (j) flight plan (Eppler and Sukowksi, 2000) III. Cartographic format

1. Geographic map: globe/continent/land/island/region, 2. informational map: park, 3. tube/metro

(Burkhard and Meier, 2005) map, 4. galaxy/stars, 5. sea/ocean, 6. building/ architectural map

IV. Metaphoric format

(a) From the natural realm: 1. tree, 2. iceberg, 3. canyon, 4. mountain, 5. river, 6...

(b) Man made artifacts: 1. house, 2. temple structure, 3. radar screen, 4. bridge, 5. race track, 6...

E. Classifying maps by their creation method (''how?'' and ''who?'')

1. Maps that are automatically and dynamically generated by the computer (such as self-organizing maps, see Kohonen, 2001)

2. Maps   that   are semi-automatically generated (automatically assembled and   then optimized by analysts)

3. Maps that are designed once by domain and mapping experts and then used in the same way by all users

4. Maps that are iteratively created, modified, or extended by the map user(s) themselves

(community generated maps)

Table 2   A possible matching matrix for knowledge map parameters

K map format/knowledge management process/purpose	I Table format	II Diagrammatic format	III Cartographic format	IV Metaphoric format
1. Creation of knowledge		M, L, C 1–3	M, L, C 1–3	M, L, C 1–3
2. Assessment or audit of knowledge	E, F, S 1–5	E, F, S 1–5		
3. Identification of knowledge	M, E 1–4	M, E, F 1–7	M, E, F 1–7	M, E, F 1–7
4. Development of knowledge		M, S, C 1–7	M, S, C 1–7	M, S, C 1–7
5. Sharing, transferring, communication of knowledge	M 2–7	M, L, C, S, F 2–7	M, L, C, S 2–7	M, L, C, S 2–7
6. Application of knowledge	M, L, S 1–7	M, L, S 1–7	M, L, S 1–7	M, L, S 1–7
7. Marketing of knowledge		M, E, C, S 4–7	M, E, C, S 4–7	M, E, C, S 4–7

Knowledge map content types: M, methods (procedural knowledge, know-how); E, experts, organizations, groups, institutions etc. (know-who, knowledge carriers); L, lessons learned, and experiences (know-why); C, concepts (declarative knowledge, know-what); F, flows or relationships (i.e., communication flows, collaboration relations); S, skills and competencies (i.e., capability maturity levels, expertise levels, core competencies, etc.). *Application Levels*: 1, personal; 2, dyadic; 3, team; 4, dept.; 5, community; 6, org.; 7, network.

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