

MaKE First Steps: a Collaborative Approach to Defining Knowledge in Organisations

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Abstract: At a time when there is a lot of debate as to what 'knowledge' means in organisations MaKE First Steps provides a practical way of addressing the issue in organisations. It is a practical approach for collaboratively defining knowledge in organisations in such a way that the definition that is created fits an organisation's needs, context and preferences. This paper describes and explains how the process works, how it was tested in a commercial environment and the results of that research. This work is highly relevant to both academics and practitioners, and the author argues that this is an excellent way for employees in organisations to commence knowledge management (KM) practically.

Keywords: Knowledge definition, collaborative process

1. Introduction

At a time when KM is presenting academics and practitioners with as many questions as answers, it is extremely valuable to have a logical way by which organisations can go about defining knowledge. This paper presents MaKE First Steps that is a process designed to do this. It does this by making use of a body of work in the domain of defining knowledge in organisations.

The paper is structured as follows: Section 2 provides theoretical foundations that underpin MaKE First Steps. Section 3 outlines the method used to devise and test MaKE First Steps and Section 4 describes and explains the process. Section 5 describes and explains how the procedure was applied in practice in a major UK Fast Moving Consumer Goods (FMCG) manufacturer and Section 6 gives a description and analysis of the feedback obtained from participants before the conclusion is provided in Section 7.

2. Theoretical foundations and assumptions

MaKE First Steps is a procedure for defining knowledge collaboratively in organisations. The approach taken in this procedure rests on various epistemological assumptions. This section outlines these assumptions and the theoretical background before its design and application is explained.

First, the authors take the view that 'knowledge' is defined, discerned and created by humans, and because humans do not always have the same view, definitions of knowledge differ. The definition of knowledge is also something that is multifaceted, changes over time, varies according to the context in which the concept is being

considered, and once it is articulated it can be something that is shared and reflected upon. In all these respects the author of MaKE First Steps agrees with Sveiby (1997) and Hirschheim, Klein and Lyytinen (1995).

These assumptions are also very practical in nature. It is clear from research into definitions of knowledge that there is very little consensus on the subject. A practical approach is one that accepts this as a reality and asks - "how can this be used to an organisation's advantage?" Because there is little consensus it is sensible to incorporate in the process a high degree of human input that is channelled into achieving a consensus. Participants can also help to validate and refine the outcome. In light of this, this research was applied in a workshop.

The scope to which MaKE First Steps can be applied in organisations is determined by the *human-determined* boundary that is deemed appropriate (e.g. the whole of a company, a department, a project, or in an information system development project). This is because the only vital ingredients for MaKE First Steps are willing participants in the organisation with an appropriate understanding of the context to which it is to be applied.

The emphasis in this research was upon defining knowledge in the context of *organisations* where *people* work and the literature survey of definitions and related concepts reflected this. However the process itself sits above the *content* of definitions and categories of knowledge.

Three broad perspectives were identified as to how the concept of knowledge can be 'defined' in the context of organisations and within each approach further sub categories exist: -

- 1. Textual Definitions

- 2. Categories of Knowledge for organisations
- 3. Knowledge as a Comparative Concept (i.e. differentiated from and compared with other entities)

MaKE First Steps incorporates the concept of knowledge from these three perspectives (in Stages 5, 6 and 7 - explained in Section 4) whilst accepting that there is overlap between them. Section 3 outlines how MaKE First Steps was devised, tested and refined.

3. Method Used to Devise and Test MaKE First Steps

The method that was used had several strands: literature search; creative design; testing, reflection and refinement.

First, a literature search was conducted into the concept of knowledge, in particular in the context of KM in organisations and intellectual capital. This literature search led to the view that three perspectives of knowledge as a concept have been taken (see Section 2) and within these three perspectives further classifications were created. Certain conclusions were reached on conducting the literature search about suitable design premises for MaKE First Steps (see Section 4).

Second, creative design work was conducted. A logical procedure was created for defining knowledge collaboratively based on the design premises. Then, the process and its component parts were tried and tested 'internally' using hypothetical situations and it was modified and honed.

Third, MaKE First Steps was tested, reflected upon and refined. Before taking it to the commercial environment, a large UK FMCG manufacturer, a questionnaire was prepared for participants to complete in writing after taking part. The questionnaire that was devised was short, simple and designed to elicit responses that would help gauge the usefulness of the approach and how, if at all, it could be improved.

10.

MaKE First Steps was conducted with a team of employees at the organisation, in a workshop. The author of MaKE and his supervisors were present to facilitate the application of MaKE First Steps. Two employees present at the workshop were central to the context for the definition of knowledge in the company and were the people who created the definition of knowledge and provided feedback on MaKE First Steps.

4. Description and explanation of MaKE first steps

The design of MaKE First Steps was based on certain premises, most of which, map from the theoretical foundations and assumptions:

1. The process is to *facilitate* the production of a definition by the employees;
2. The *employees* should refine and shape it and ultimately be happy with it;
3. Information of experts on the concept of knowledge would be joined with 'where the employees are coming from' after the participants have expressed their own view;
4. The procedure is allied with establishing a context for KM in the organisation;
5. An acceptance that the definition may only be relevant for a certain period of time;
6. That a comprehensive approach would be taken in the first trial of the procedure. This would provide plenty of scope for the creation of a definition as long or short as the participants chose;
7. An acceptance that there maybe disagreements that may need to be addressed in the process;
8. Adopt a practical view accepting that users time is limited and;
9. That the process would seek to help users navigate and 'tap into' a body of work about the concept of knowledge in a relatively simple way using *visual tools* to do so.

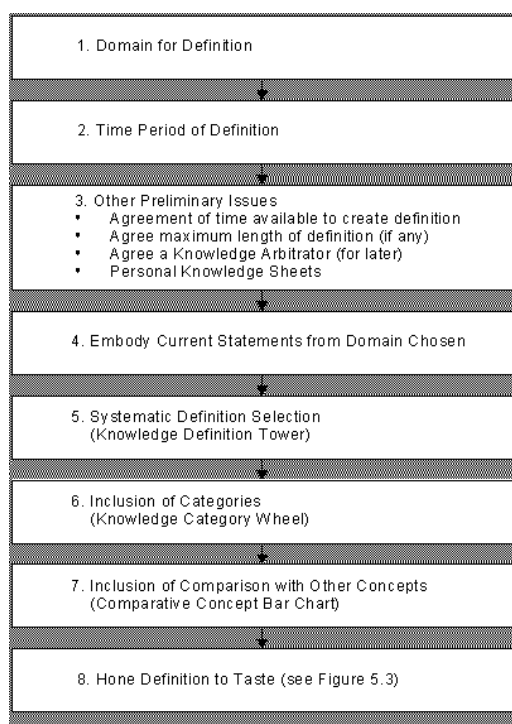


Figure 1: Provides a step-by-step overview of MaKE First Steps.

4.1 Context of Definition

This stage is the one where the context for which the definition is determined. The boundary of the

Context is people-dependent. Once the context has been determined, suitable employees can be chosen to participate in MaKE First Steps. A suitable participant is a person who has an overview of the context that has been chosen. Two, three or four participants are required. Input from more than one person tends to help in drafting. A group that is no bigger than four in size is practicably easy to manage.

4.2 Time Period for Definition

This is the stage where the time for which the definition is designed to 'last' before it may be amended is determined (e.g. six months, a year, etc). If participants have no clear view on this then an indeterminate time can be stated.

4.3 Other Preliminary Issues

The first three of the other preliminary issues are practical ones. First, agree how much time the participants have for *creating* the definition. Second, if there are any views on an ideal length for the definition (e.g. not more than one page) then these should be stated at this stage. Third, the participants agree on a 'Knowledge Arbitrator'. The Knowledge Arbitrator is appointed in case there is an undecided dispute later in the process

that needs to be addressed before the time period for creating the definition expires.

The other thing the participants are asked to do is write down on a blank sheet of paper what they think should be in the definition of knowledge. This is done very quickly and can constitute any notes of things that participants think should be included. This is done at this early stage so participants bring 'to the table' what they 'have to offer' before they consider a wider body of knowledge to which their initial thoughts may be joined.

4.4 Embody Current Statements from Chosen Context?

Participants may also 'bring to the table' current statements the organisation may have for the context for which the definition is being created. Examples of these may include mission statements, department mottoes and past attempts at defining what is important for employees.

4.5 Systematic Definition Selection (Knowledge Definition Tower)

This stage is where participants systematically navigate through definitions of knowledge that have been devised by experts. Suitable definitions are selected and used as a starting point for creating a definition for their context.

To help do this, a visual tool called the Knowledge Definition Tower (see Figure 2) is used. The Knowledge Definition Tower has four layers that can help navigate to definitions of knowledge that could help the participants. The Tower itself represents definitions of knowledge *that have been articulated* and can be used in the application of MaKE First Steps. Outside the Tower are definitions that had not been articulated or are not accessible in the application of MaKE First Steps at the time when it was first applied. Moving towards the top of the Tower the levels become increasingly abstract, philosophical and tacit in nature, whereas as you move towards the 'ground' the categories become increasingly tangible, explicit, tangible and related to the physical world.

The Tower maps to definitions of knowledge (predominantly made by experts in the fields of KM and intellectual capital) that are categorised and numbered according to the Tower levels. In a number of cases definitions have elements of more than one level, and are categorised accordingly. References for definitions of knowledge that were used in the initial application of MaKE First Steps are noted in Appendix B.

To navigate to definitions using the Knowledge Definitions Tower the participants go through the

process outlined in Figure 3. This entails selecting level(s) from the Tower and using this as a starting point for selecting definitions with expert help. The selected definitions are copied, pasted and listed on a computer in a word processing package in the Knowledge Definition Template (see Appendix A). The participants can then highlight parts of the definitions that they wish to include in their final version. Once this is done the participants complete the other stages of MaKE First Steps.

4.6 Knowledge Categories Wheel

Experts in KM have devised categories to help organisations understand and analyse knowledge. Participants in MaKE First Steps may use these categories (or headings of categories) to define 'knowledge' and Stage 6 addresses the issue of whether they wish to do this. A tool called the Knowledge Categories Wheel is used to select any such categories or headings the participants may wish to include (see Figures 4, 5, and 6). The Wheel has an inner and outer ring and the category headings map to a table that contains greater detail in case participants wish to refer to it. Table 1 provides a summary of references for categories of knowledge that were used in the initial application of MaKE First Steps (see Appendix B).

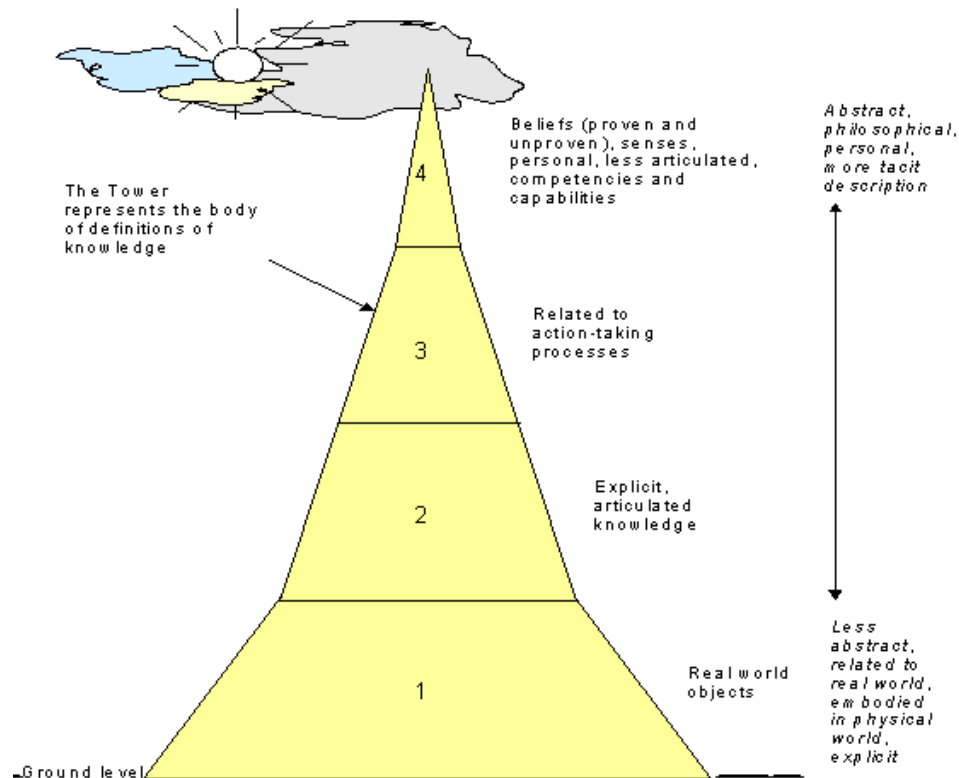


Figure 2: Knowledge definition tower

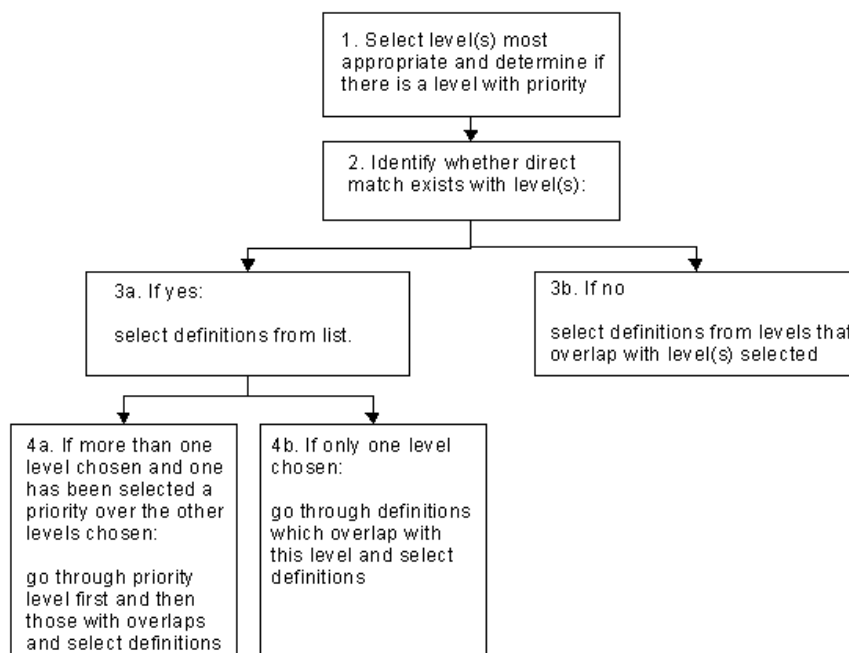


Figure 3: Systematic Definition Selection

The overview of the Knowledge Categories Wheel (Figure 4) maps to the summary of inner and outer rings illustrated in Figure 5 and Figure 6. The numbers and letters in the segments shown in Figure 4 cross refer to the equivalent letters and numbers in Figure 5 and Figure 6, which in turn

trace back to the original sources (see Appendix B). The Outer Ring refers to categories that are generally more broadly applicable (i.e. *beyond* organisations) whereas the Inner Ring refers to categories more specifically designed *for* organisations.

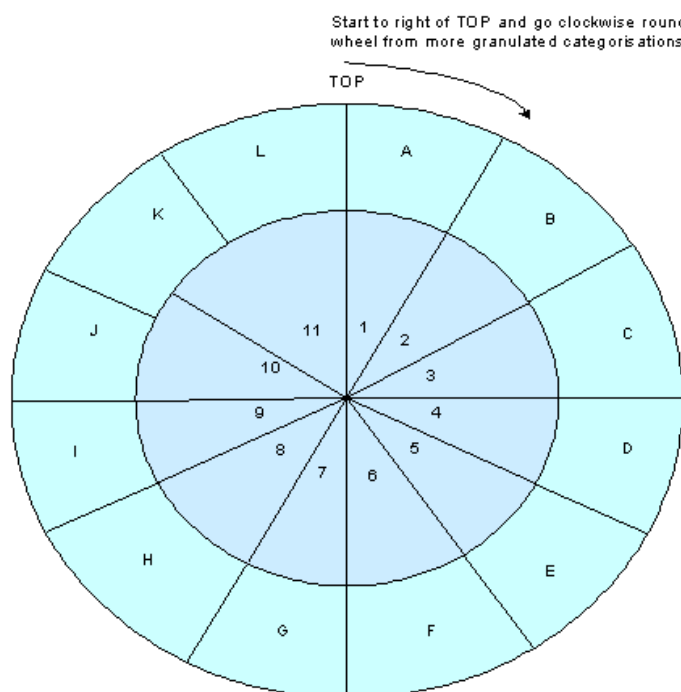


Figure 4: Knowledge Categories Wheel - Overview



Figure 5: Knowledge Categories Wheel – Summary of Outer Ring

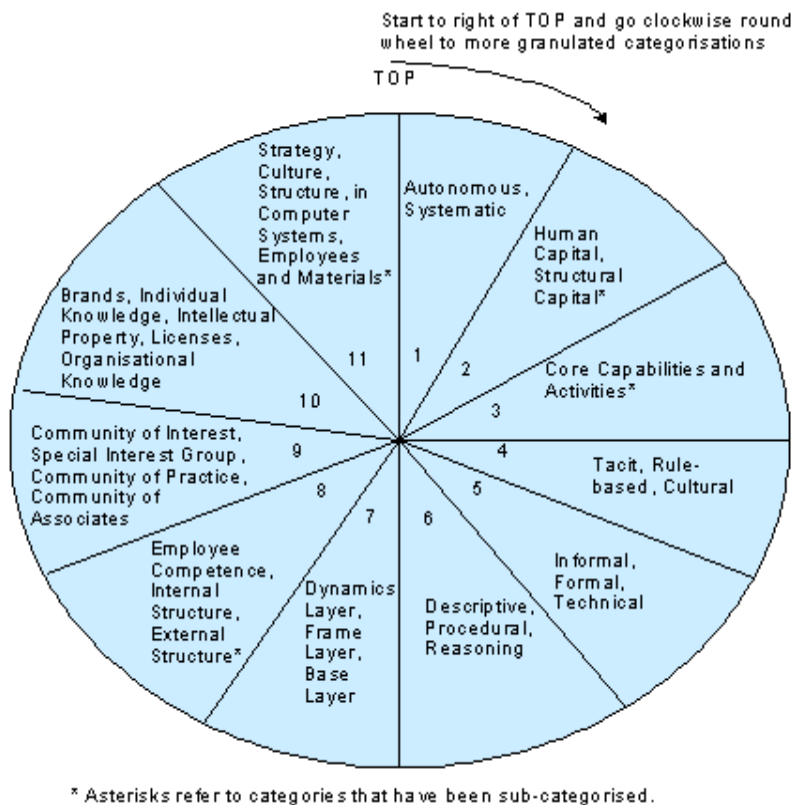


Figure 6: Knowledge Categories Wheel – Summary of Inner Ring

4.7 Knowledge as Comparative Concept

Stage 7 of MaKE First Steps considers knowledge as a comparative concept; one that can be compared with information, data and other such closely related concepts. A number of comparative concepts have been devised and are summarised in the Comparative Concept Bar Chart (see Figure 7). The sets of comparative concepts are referred to in Appendix B.

The participants decide whether to include any element of this in their Knowledge Definition Template. However the bar chart is a summary device and cannot be simply applied, since behind each set of compared concepts there are different

views as to how the compared concepts are differentiated. In some cases summarising this is extremely complex and deep conceptual thinking about knowledge may seem abstract to some employees. As with the other stages of MaKE First Steps, this stage is only explored to the extent that participants wish to pursue it.

4.8 Hone Definition to Taste

Once Stages 1 to 7 have been completed the accumulated material is put in to the Knowledge Definition Template and then the honing process begins. This stage is iterative and is illustrated in Figure 8.

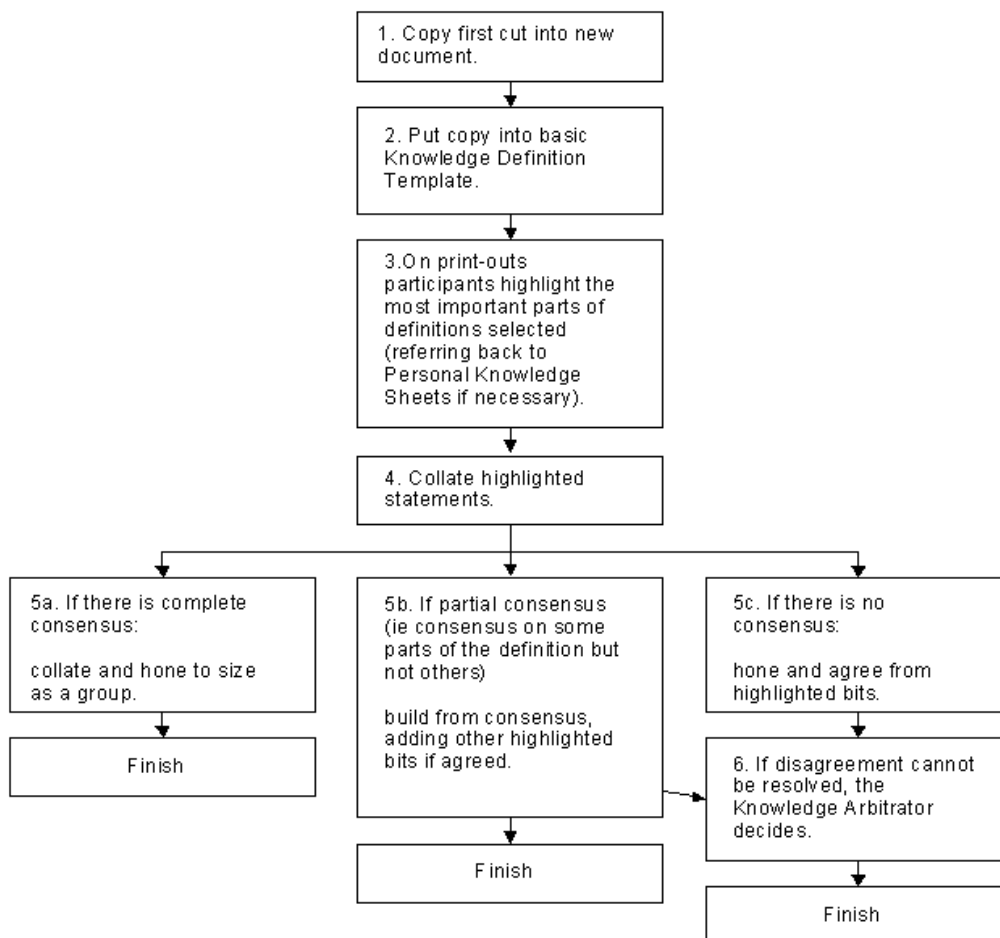


Figure 8: Hone Definition to Taste

Stage 8 is one of the most important stages of MaKE First Steps. This is because it is important for participants to tailor the definition to their satisfaction. In doing so, the participants become more obviously 'owners' of the definition and make it relevant to their context. It also brings closure to the MaKE First Steps process.

The key features to note about the honing process are below.

- The collation of highlighted statements is through a process that starts with highlighting hard copy definitions and then collating the definition into one coherent definition
- At first, this is done by inclusion of AND between the various parts of the definition (see Template Part 4 in Appendix A), but

during the honing process unnecessary words are removed

- The process of honing takes place using a computer and word processing package
- Changes are made only if there is consensus among the participants

- The honing process relies to some degree on the part-intuitive process of drafting
- If there is a disagreement during the honing process the Knowledge Arbitrator will resolve the disagreement and move the process towards its conclusion

Degree of Granularity (number of concepts compared)													Decision
					Expertise		Action		Judgement				
					Capability								
	Wisdom				Experience		Decision		Insight				
	Knowledge	Knowledge	Knowledge	Knowledge	Knowledge	Knowledge	Knowledge	Knowledge	Knowledge	Knowledge			
Information	Information	Information	Information	Information	Information	Information	Information	Information	Information	Information			
Data	Data	Data	Data	Data	Data	Data	Data	Data	Data	Data			
Authors													
1. Avison and Fitzgerald, 1997													
2. Boissot, 1998													
3. Churchman, 1972													
4. Marchand, 1998													
5. Marshall, et al., 1996													
6. Spiegler, 2000													
7. Amidon, 1997													
8. Hirschheim et al., 1995													
9. Sharp, 2002b													
10. Stewart, 1997													
11. Rus and Lindvall, 2002													
12. Beckman, 2000													
13. Wilson, 1996													
14. Wall Van Lohuizen, 1986													

Figure 7: Comparative Concept Bar Chart

5. Summary of How MaKE First Steps was Applied in an FMCG

The company in which the implementation phase of the research took place is a major UK FMCG manufacturer and distributor. It makes and distributes FMCG branded goods. It has several brands within the 20 top-selling grocery brands in the UK and holds major UK franchises.

MaKE can theoretically be applied to any company of any size. However, there are a number of reasons why this company provided a good context for the research. KM software project work had been conducted at the company, and it was likely they would be receptive to the application of the research. There is little, if any, reported KM work applied to a manufacturing company in the UK.

A workshop was the context in which MaKE First Steps was applied. There were seven people present at the workshop: four employees, the author and his two supervisors. The four employees held different positions within the company. One was a newly appointed IT Project Manager, who was introduced to the project. Another was an IT Development Programme Manager, who had been involved in the negotiations about the project over the previous eleven months. There was also an Insight Resource Manager and a Head of Category Insight, who had an overview of the domain to which the project would be applied.

The exact domain to which MaKE would be applied had not been articulated before MaKE First Steps was implemented. However, the IT-based KM project was being undertaken across the marketing and sales functions of the company, and two of the employees in the workshop were overseeing that project. It was decided that this project would relate to the area of the company over which they had an overview, and that they would be the participants involved in MaKE First Steps. Those who were not directly relevant to the domain for which the definition was being created, only helped with Stage 8.

An agenda was agreed for the workshop. It was agreed to allocate three and quarter hours in total for conducting MaKE First Steps. MaKE First Steps was only applied once. Only one definition of knowledge for the chosen domain is necessary to initiate the use of the other components of MaKE.

6. Description and Analysis of Feedback

There are a number of forms of feedback for MaKE First Steps that derived from application of MaKE First Steps in the company in which it was applied. These were formal direct (i.e. written responses in questionnaire), direct (i.e. oral communication of participants), indirect (i.e. from colleagues in the organisation), and reflections in and on practice at the workshop.

6.1 Formal direct

The two participants, who defined knowledge in the company using MaKE First Steps, completed the questionnaire in writing. One was appointed the 'Knowledge Arbitrator' (Employee A). The other participant is referred to as Employee B below.

The questions in the questionnaire were:

- 1. How useful is the Knowledge Definition procedure for arriving at a practical definition of knowledge?
- 2. Please specify whether you think it could be improved and, if so, precisely what feature(s) of it could be improved and how?

The written feedback on the questionnaire is discussed below in terms of the process overall and individual stages. All comments in square brackets are to help the reader understand quotations.

6.2 Process Overall

Generally the process was considered useful, comprehensive and works (though with qualification in the case of Employee B):

- "8 step process is useful in breaking down the task in to manageable chunks" (Employee A)
- "Appears fairly comprehensive. We arrived at a definition, but the procedure does not allow understanding what you may have missed. If you accept this then it works." (Employee B)
- "Ultimately, has the procedure moved thinking on, clarified it or started from a new point?" (Employee B)

6.3 Individual Stages:

6.3.1 Stage 1

Neither employee commented.

6.3.2 Stage 2

Employee A pointed out that what Box 2 refers to (see Figure 1) could be clarified: -

- "Box 2: Time period could be confusing re difference between longevity of the definition vs. the time period over which the process [MaKE First Steps] takes place."

6.3.3 Stage 3

This stage was considered useful and Employee B suggested more formal structured incorporation of it in the process: -

- "Again - v. useful." (Employee A)
- "The brainstorm [part of Stage 3] might be developed to 'knowledge definitions' 'outputs' as [Employee A] had done. It clarifies the thinking. Also, there should be greater readiness to bring the brainstorm in as an active, prompted step rather than the more ad hoc manner we used." (Employee B)

Employee B queried whether the definition produced by MaKE First Steps might conflict with cultural trends in the company: -

- "Also, are there any definitions currently in use (we have had one) by the business."

Should this be discounted (i.e. will it cause a conflict with current cultural acceptance?) and should this therefore be built in?"

6.3.4 Stage 5

Employee A commented on Stage 5 as follows which corroborates to some extent with Employee B's comments on the overall process: -

- "Box 5: - Like the idea and thought behind it - but it is a v. difficult question to answer (i.e. pick a number [level of tower] without concrete examples of what goes at each level. Perhaps using some form of specific analogy would help."

6.3.5 Stage 6

Employee B queried the usefulness of Stage 6 (knowledge categories): -

- "Box 6: Didn't really understand how/what categories would add? Should this be something that is after the definition has been arrived at?"

6.3.6 Stage 7

Neither employee commented though a comparative concept internally devised in the company was incorporated in the template.

6.3.7 Stage 8

Employee A regarded this stage, the template and honing process as good:-

- "Process of using the online 'AND' to then breakdown and synthesise was good."

No comment from Employee B on this stage.

6.4 Informal direct

Conversation with the participants during the process reflected a high degree of engagement in the process and 'buying in' to the collaborative nature of the process. It also suggested that engagement in MaKE First Steps had prompted interest in the whole concept of knowledge, which previously had not been considered as much, and questions about the business's culture and frameworks already produced within the company were raised.

6.4.1 Indirect feedback

The knowledge definition that was devised was used in presentations within the business that suggests the participants in MaKE First Steps endorsed the outcome of the process.

The definition was also used in the application of the remainder of MaKE and employees within the context rarely, if at all, suggested alterations to the

definition of knowledge that resulted from the application of MaKE First Steps.

6.4.2 Reflection in and on practice

MaKE First Steps took approximately 2 hours and 30 minutes and the authors noted the difficulty of navigating through the Knowledge Tower, and also whether it is appropriate to include stages 6 and 7 in the process and, if so, how to do so practically.

The significance of the feedback for MaKE First Steps is summarised below.

- The concept of defining knowledge for business context is endorsed;
- The process works;
- Stage 3 may be improved by making the brainstorming session a more 'formal' aspect of the process;
- The concept of Knowledge Tower (Stage 5) is endorsed but some form of specific analogy would help;
- It is questionable whether knowledge categories and the comparative concept aspects (Stages 6 and 7) should be included as part of the process and;
- The process tends to generate thinking by participants as to what 'knowledge' constitutes for them and this tends to focus on what is *valuable* to them - hence the final product is a valuable starting point for MaKE (Sharp, 2006).

There is scope for future testing of MaKE First Steps that adopts these changes and applies the process to a wide range of different contexts.

7. Conclusion

There is a lack of consensus as to what knowledge is and what constitutes KM in organisations. However, MaKE First Steps is a process that seeks to facilitate the production of definitions of knowledge that are relevant to organisations. The process facilitates the reaching of a consensus in practice. The process inevitably helps focus thinking on what is valuable to the organisation (Stewart, 1997). The collaborative involvement of participants in the process engenders a sense of shared ownership of the final product that adds value to it. Furthermore, this provides a good starting point for *management* of 'knowledge' in the organisational context. In doing this, MaKE First Steps bridges the gap between theory and practice in the world of KM.

Note about MaKE and MaKE first steps

MaKE stands for 'Manage Knowledge Effectively' (Sharp, 2003). The author wishes to acknowledge that this is not to be confused with an acronym similar, but different to this one, which is described in Winfield, M. J., Basden, A., and Cresswell, I. (1996), Knowledge Elicitation Using

a Multi-Modal Approach, *World Futures*, Vol. 47, pp.93-101. MaKE is a trademark owned by its author, Peter Sharp who also designed and created MaKE First Steps. Michael Simm helped 'test' it prior to taking it into a commercial environment. Alan Eardley and Hanifa Shah were Peter's supervisors.

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Appendix A

KNOWLEDGE DEFINITION TEMPLATE

Date:

Knowledge Arbitrator:

Position of Knowledge Arbitrator:

1. CONTEXT FOR KNOWLEDGE DEFINITION**2. TIME PERIOD FOR KNOWLEDGE DEFINITION**

3. EMBODY CURRENT STATEMENTS RELEVANT TO CONTEXT (E.g Company (Mission Statement), Department (Statement of Ethos of Department, rules), Project (E.g. Aims and Objectives of Project) and Computer System (e.g. Specification)

4. SYSTEMATIC KNOWLEDGE DEFINITION SELECTION

Knowledge in the above context for the period specified (if any) is:

AND

AND

AND the following categories can be used to categorise it:

AND these EXTRA NOTES were deemed relevant

It can be compared or differentiated from other related concepts as follows:

AND it was also thought the following should be stated about the Knowledge Definition we devised

Appendix B Cross References for Stages 4, 5 and 6 of MaKE First Steps

Author Reference	Textual Definition		Categories of knowledge		Comparative Concept	
	Was one used from this source?	Level (s) of Knowledge Tower	Were categories used from this source?	Cross reference letter or number (Wheel)	Is there such a concept from this source?	Cross reference number (Bar Chart)
Amidon (1997)					Yes	8 (Data, Information, Knowledge, Wisdom)
Avison and Fitzgerald (1997)					Yes	1 (Data, Information, Knowledge)
Baskerville, Pawlowski and McLean (undated, p.397) and Myers (1996)	Yes	1, 2 and 3				
Beckman (2000)	Yes	2 (action taking processes), 2 and 3	Yes	G (Tacit, Implicit, Explicit) H (Human-Mind, Organisation, Paper, Electronic)	Yes	13 (Data, Information, Knowledge, Expertise, Capability)
Beckman (2000) citing Nonaka (undated)			Yes	J (Experience, Perception, Practice, Mind, Theory)		
Beckman (2000) citing Quinn (undated)			Yes	K (Know-what, How, Where, Why, Care-why)		

Author Reference	Textual Definition		Categories of knowledge		Comparative Concept	
	Was one used from this source?	Level (s) of Knowledge Tower	Were categories used from this source?	Cross reference letter or number (Wheel)	Is there such a concept from this source?	Cross reference number (Bar Chart)
Beckman (2000) citing Sowa	Yes	2 (action taking processes)				
Beckman (2000) citing Turban	Yes	1, 2 and 3				
Beckman (2000) citing van der Spek (undated)	Yes	1 and 2	Yes	L (Symbolic, Embodied, Embrained, Encultured, Availability, Content)		
	Was one used from this source ?	Level (s) of Knowledge Tower	Were categories used from this source?	Cross reference letter or number (Wheel)	Is there such a concept from this source?	Cross reference number (Bar Chart)
Blecker and Neumann (2000) citing Neumann (1999)			Yes	A (Declarative, Procedural) C (Cognitive, Doing) G (Tacit, Explicit)		
Boisot (1998)			Yes	B (Abstract, Codified)	Yes	2 (Data, Information, Knowledge)
Buckowitz and Petrash (1997)			Yes	10 (Brands, Individual Knowledge, Intellectual Property, Licenses, Organisational Knowledge)		
Choo (2001)			Yes	4 (Tacit, Rule-Based, Cultural)		
Clark (2002)			Yes	G (Tacit, Explicit)		
Clarke and Cooper (2000)			Yes	G (Tacit, Explicit)		
Davenport and Prusak (1998 p.5)	Yes	1, 2 and 3				
Reimer (2001 p.1.5) (Definition 2) citing Ackoff and Emery (1972)	Yes	2 (action taking processes)				
Edvinsson and Malone (1997)			Yes	2 (Human Capital, Structural Capital)		

Author Reference	Textual Definition		Categories of knowledge		Comparative Concept	
	Was one used from this source?	Level (s) of Knowledge Tower	Were categories used from this source?	Cross reference letter or number (Wheel)	Is there such a concept from this source?	Cross reference number (Bar Chart)
Franke (2000 p. 31)	Yes	1 and 3				
Hall, Stivers, Covin and Smalt (1996)	Yes	1 and 2				
Hanley and Dawson (2000)			Yes	9 (Community of Interest, Special Interest Group, Community of Practice, Community of Associates)		
Hirschheim, Klein and Lyytinen (1995)	Yes	1 (Beliefs - Approved) (p.14)			Yes	9 (Data, Information, Knowledge, Wisdom)
Holsapple and Joshi (2001)	Yes	1,2,3,4	Yes	6 (Descriptive, Procedural, Reasoning), 11 (Purpose, Strategy, Culture, Structure, Computer Systems, Employees, Materials)		
Kanevsky and Housel (1998)	Yes	1, 2, 3 and 4				
Knowledge Management Unit, DTI (2001)	Yes	1, 2 and 3				
Kundtz and Kistler-Glendon (2000)	Yes	3 (articulated with context)				
Kusonaki, Nonaka and Nagata (1998)			Yes	7 (Frame Layers, Base Layers)		
Leonard-Barton (1995)			Yes	3 (Core Capabilities, Rigidities)		
Liebeskind (1996 p. 94)	Yes	1 and 3				
Liu (2000)			Yes	5 (Informal, Formal, Technical)		
Liu, K (2001 p.50), citing Bradley and Swartz, (1979)	Yes	1 (Beliefs)				
Machlup (1980)	Yes	2 and 3	Yes	F (Known, Knower, Knowing)		

Author Reference	Textual Definition		Categories of knowledge		Comparative Concept	
	Was one used from this source?	Level (s) of Knowledge Tower	Were categories used from this source?	Cross reference letter or number (Wheel)	Is there such a concept from this source?	Cross reference number (Bar Chart)
Malhotra (2000) citing Churchman (1972)	Yes	1 and 2			Yes (Churchman)	3 (Data, Information, Knowledge)
Marchand (1998)					Yes	4 (Data, Information, Knowledge)
Marshall, Prusak, and Shpilberg (1996)					Yes	5 (Data, Information, Knowledge)
McCleod (ed)(1986, p.469)	Yes	1 (Personal - known)	1 (Competencies/capabilities)			
Meadows, Marshall and Vishrut (2000), on occasions citing Prahalad and Hamel, (1990)	Yes					
Mentzas and Apostolou (1998) citing and summarising Nonaka and Takeuchi (1995)			Yes	G (Tacit, Explicit)		
Plotkin (1994)	Yes	1 (Beliefs), and 1 and 4				
Polanyi (1998, p.18)	Yes	1 (Personal - act of knowing, inarticulate)				
Popper (1997)	Yes	1 (Beliefs - 'Proven')				
Quingrui and Yong (2001)	Yes	1, 2, 3 and 4				
Rus, Lindvall and Sinha (2002)	Yes	1 (Beliefs - 'Proven') (citing Merriam-Webster (2001))			Yes	12 (Data, Information, Knowledge, Experience)
Sharp (2002)					Yes	10 (Data, Information, Knowledge, Wisdom)
Spiegler (2000,	Yes	1, 2 and 3 (p.11)			Yes	7 (Data, Information, Knowledge)
Stewart (1998)					Yes	11 (Data, Information, Knowledge, Wisdom)

Author Reference	Textual Definition		Categories of knowledge		Comparative Concept	
	Was one used from this source?	Level (s) of Knowledge Tower	Were categories used from this source?	Cross reference letter or number (Wheel)	Is there such a concept from this source?	Cross reference number (Bar Chart)
Sveiby (1997)	Yes	1 and 2 (p.37)	Yes	8 (Employee Competence, Internal Structure, External Structure)		
Teece (1998)			Yes	B (Codified), 1 (Autonomous, Systematic)		
Wali Van Lohuizen (1986)					Yes	15 (Data, Information, Knowledge, Insight, Judgement, Decision)
Wiig (1993)	Yes	1 and 2 (p.76)	Yes	I (Factual, Conceptual, Expectational, Methodological)		
Wilson (1996)	Yes	1 (Personal - known) (p.33)			Yes	14 (Data, Information, Knowledge, Decision, Action)
Yu-N and Abidi (2000)	Yes	1, 2, 3 and 4				

