Visual Tools within MaKE - A Knowledge Management Method

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Abstract: This paper focuses on the practical significance of visual tools in Knowledge Management (KM) and Information Systems (IS) development in the context of the development of MaKE, a KM method.

Visual tools are used extensively in KM and IS. However, this paper identifies a dilemma in the use of visual tools and examines how this dilemma was addressed during the development of some visual tools in MaKE. A brief description of MaKE is provided before visual tools are presented and discussed. The visual tools are called the Knowledge Targets Pyramid, Knowledge Tree, Knowledge Block, and the Linking Overview which are used to help present outcomes. They were reviewed and analysed in workshops in a major UK Fast Moving Consumer Goods manufacturer.

The authors suggest that the findings of this research are relevant to visual tools used as part of KM methods and frameworks and that if certain guidelines are borne in mind, visual tools are very helpful for understanding and communicating, in a short time frame, relatively complex phenomena. Within the context of MaKE the Knowledge Targets Pyramid, Knowledge Block, and the Linking Overview do this more effectively than the Knowledge Tree.

Keywords: Knowledge Management method, action research, visual tools

1. Introduction

There is a need for Knowledge Management (KM) not to remain purely in the realms of academic thought, but be translated into practically relevant structures that can benefit organisations.

This is a relatively simple to write, but difficult to bring into practice and is particularly significant in KM and Information Systems (IS) development today. The authors argue that much work is required to hone useful KM concepts to create practically valuable outcomes. This can be done by applying and reflecting on KM concepts in organisations.

This paper examines the use of some visual tools developed in the context of MaKE - a KM method. This is done by outlining the practical significance of visual tools in KM and IS in Section 2 before a dilemma associated with the use of visual tools is identified in Section 3. MaKE and 'Outcome Visual Tools' are introduced in Section 4 and Section 5 contains a brief description of the research method and the context for the research. The visual tools and the feedback about them are provided in Section 6.

2. The practical significance of visual tools in IS and KM

'Visual tools' are used in this paper to refer to diagrams and tables used for purposes such as illustration, elicitation, description or explanation. The practical significance of visual tools in is and km is endorsed by the wide use of them in both domains.

IS methodologies use visual tools extensively. Examples of these include the Unified Modelling Language (Booch, Jacobson, Rumbaugh, 1999), Jackson System Development, Structured Systems Analysis and Design Method (Avison and Fitzgerald, 1997), Methods for Elicitation, Analysis and Specification of User Requirements (Liu, 2000), and Soft Systems Methodology (Checkland and Scholes, 2000). These methodologies use visual tools to clarify IS domains, communicate IS requirements and provide structures for designing or understanding software.

In KM visual tools are widely used in frameworks, models, methods and evaluative techniques. Examples of where visual tools are used include the Core Capabilities and Activities framework (Leonard Barton, 1995), Knowing Organisation Model (Choo, 2001), Organizational Capabilities Framework (Kusunoki, Nonaka, and Nagata, 1998), Intellectual Capital Model (Edvinsson and Malone, 1997) and the Three-Fold Framework (Holsapple and Joshi, 2001). Normally these visual tools are used to help simplify complex detail or summarise the overall 'picture' and thereby enhance the communicability of a viewpoint or content.

3. Dilemma associated with use of visual tools

There is a dilemma in the use of visual tools that the author of MaKE ('the Designer') was aware of when designing it. The use of visual

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tools to simplify or summarise complex phenomena may enhance communicability but paradoxically may lead to misunderstanding and misrepresentation of what is being communicated.

This problem has been identified in the context of symbolic notation and logical rules where, in simplifying what is done, much of the richness and usefulness is diluted. This is one reason for advocating case study as a storytelling device (Remenyi, Money, Price and Bannister, 2002). A similar problem has been identified in the use of frameworks (Doyle, 1991). Some frameworks simplify to such an extent, that they obscure insight and can give rise to distortion. In intellectual capital (IC) there is a difficulty of making evaluative tools that are sufficiently detailed to measure the value of intangible assets but at the same time are navigable and communicable across companies (Edvinsson and Malone, 1997). This problem led to years of work to develop an approach that attempted to do both (Skandia Navigator). Therefore the drive for simplification and clarity needs to be balanced with inclusion of sufficient detail in visual tools. This challenge is significant for KM and IC frameworks and was relevant in the development of MaKE. The next section introduces MaKE and Outcome Visual Tools.

4. MaKE and outcome visual tools

MaKE stands for 'Manage Knowledge Effectively', which is a statement of intent and label for a new KM method. MaKE is designed to help organisations manage and evaluate knowledge effectively (Sharp 2002a). It builds on the concept of SolSkeme (Sharp, 2002b) and is designed to address a number of practical challenges that have been identified in KM (Sharp, 2002b). SolSkeme built on principles and concepts adopted in the Three-Fold Framework (Holsapple and Joshi, 2001).

Figure 1 illustrates MaKE. MaKE has three major components applied in sequence. It begins with MaKE First Steps. The outcome of this component is a definition of knowledge for the context to which the rest of MaKE is to be applied. This definition is used as a starting point of MaKE Direct and MaKE Executive**.** MaKE Direct is conducted with employees to elicit 'Knowledge Requirements' and the means by which the Knowledge Requirements may be achieved (Sharp, 2002a). In theory MaKE Direct can be conducted any number of times and this is represented by the 'MaKE Direct n' ellipse in **Figure 1**. The Knowledge Requirements are ranked in a ranking table and pooled within the MaKE Executive component and Knowledge Targets and their associated Knowledge Blocks are generated. Once this is completed MaKE Measures is implemented to marry up appropriate measures with knowledge manipulation activities in the Knowledge Blocks. A Linking Overview can also be generated. In **Figure 1** there is a dotted line from MaKE Measures to MaKE First Steps because MaKE is designed to be used repeatedly at periodic intervals. This can be done to see whether Knowledge Targets have been achieved and knowledge manipulation activities have been effectively carried out. The latter can be gauged by reference to measures and indicators in the Knowledge Blocks. When MaKE is applied in a new cycle new Knowledge Targets may be articulated as previous Knowledge Targets are achieved and the organisations' circumstances change.

MaKE is a *process* that produces a number of *outcomes*. MaKE uses visual tools to assist in the implementation of the process and illustration of the outcomes. The visual tools provide frameworks for collating, categorising and structuring information. Some of the visual tools have more than one of these uses.

Only some of MaKE's visual tools are discussed in this paper. **Table 1** provides a summary of the main components and the primary visual outputs that have existed within MaKE. This paper focuses on visual tools used to help illustrate some of the *outcomes* of MaKE which are identified by asterisks below ("Outcome Visual Tools"). One of these, the Knowledge Tree, does not appear in **Figure 1** for reasons explained in Section 5.

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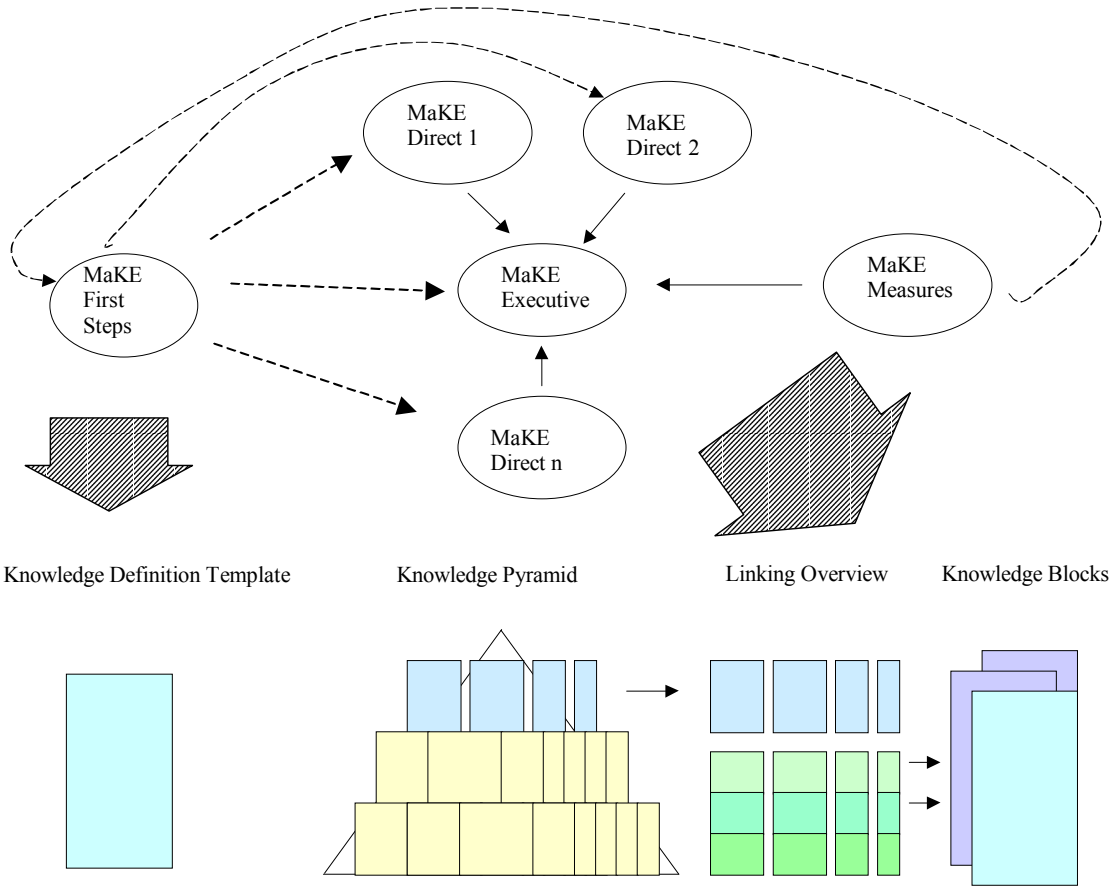

Figure 1: Summary of Components of MaKE

Table 1: Components and primary visual outputs of MaKE

Component		Summary of What it Does	Primary Visual Outputs
1	MaKE First Steps	Process to facilitate creation of knowledge definition for context to which MaKE is applied.	- Knowledge Definition Template
2	MaKE Direct and MaKE Executive	Application of SolSkeme (Sharp, 2002b) in an updated form. This involves prioritising Knowledge Targets and articulating means of achieving them.	- Knowledge Tree* - Knowledge Targets Pyramid* - Knowledge Blocks*
3	MaKE Measures	Presentation of results and applying measures.	- Linking Overview*

5. Research method and context of feedback

MaKE was tested, validated and developed at a major UK Fast Moving Consumer Goods (FMCG) manufacturer. The company makes and distributes FMCG branded goods and it has several brands within the top 20 best selling grocery brands in the UK. MaKE was applied and developed within the context of marketing and sales functions of a brand of the company.

The Outcome Visual Tools were used as part of a piece of action research and were discussed in workshops with senior managers in the company who worked in IT and business departments. These workshops occurred within two full cycles of the application of MaKE, which are referred to as 'Cycle 1' and 'Cycle 2' in the rest of this paper.

Over the course of the two cycles the form of MaKE changed and some of the visual tools were discarded and replaced. This meant that the collection of Outcome Visual Tools was different at the start than at the end of the action research. **Table 2** provides a brief summary of visual tools that were retained,

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discarded or created over the course of the action research.

A mixture of techniques was used to elicit feedback during the workshops including written questionnaires, discussion with participants and personal reflection on the design. In particular the focus was upon whether the Outcome Visual Tools performed their function effectively and were deemed useful and clear in presenting outcomes (i.e. addressing the dilemma referred to in Section 3).

Table 2: Outcome Visual Tools Discarded, Retained, or Created

Visual Tool	Part of Initial Design?	Discarded, Retained, Created and at what stage	If retained, was it modified?
Knowledge Tree	Yes	Discarded between Cycle 1 and Cycle 2	Not retained
Knowledge Targets Pyramid	Yes	Retained	Slightly modified
Knowledge Block	No	Created between Cycle 1 and Cycle 2	Retained and integrated with Linking Overview
Linking Overview	No	Created between Cycle 1 and Cycle 2	See above cell

6. Outcome visual tools and feedback during development of MaKE

Sections 6.1 to 6.4 provide a description of each Outcome Visual Tool and feedback about them. The feedback came in various forms; written responses in questionnaires ('Formal Direct Feedback'); verbal communication with the Designer in workshops ('Informal Direct Feedback'); verbal communication from colleagues in the organisation outside workshops ('Indirect Feedback') and in the form of reflections in and on practice.

The senior managers who were involved in the workshops are referred to as Employees A, B, and C. They had an overview of the context to which MaKE was applied. Employees A and B were at the workshop for Cycle 1, and Employees A, B and C were present at the workshop for Cycle 2. The three authors were also present at these workshops. The feedback was primarily qualitative in nature.

6.1 Knowledge targets pyramid

This visual tool shows Knowledge Targets ('Targets') that the organisation should aim for and is illustrated in **Figure 2**. The shape of the profile of the pyramid depends on the organisation to which MaKE is applied. The Knowledge Targets are the Knowledge Requirements that are a 'left standing' at the top of the pyramid and are prioritised by a coordination team at a senior management level.

This Outcome Visual Tool was retained throughout the implementation of the action research and therefore feedback was obtained from Cycle 1 *and* 2. The Formal and Informal Direct Feedback from Cycle 1 endorsed the view that the Pyramid is useful in helping to clarify what the organisation should aim for in the context to which MaKE is applied. Employee A recommended incorporating a description of how Targets are generated at level 4 working up from level 1. There was no Indirect Feedback and the Designer concurred with the above on the semantics of the visual tool.

Overall the feedback suggested that the Knowledge Targets Pyramid ('the Pyramid') was useful and the Designer decided to retain it. The feedback also suggested that the visual tool struck a good balance between clarity and detail, although perhaps only so far as it interlocks with other features of MaKE. In Cycle 2, the Designer introduced the Knowledge Block feature that interlocks with the Pyramid (Section 6.3). It was also suggested that another Outcome Visual Tool that links Knowledge Targets with Knowledge Blocks would be helpful. This led to the production of the Linking Overview (Section 6.4).

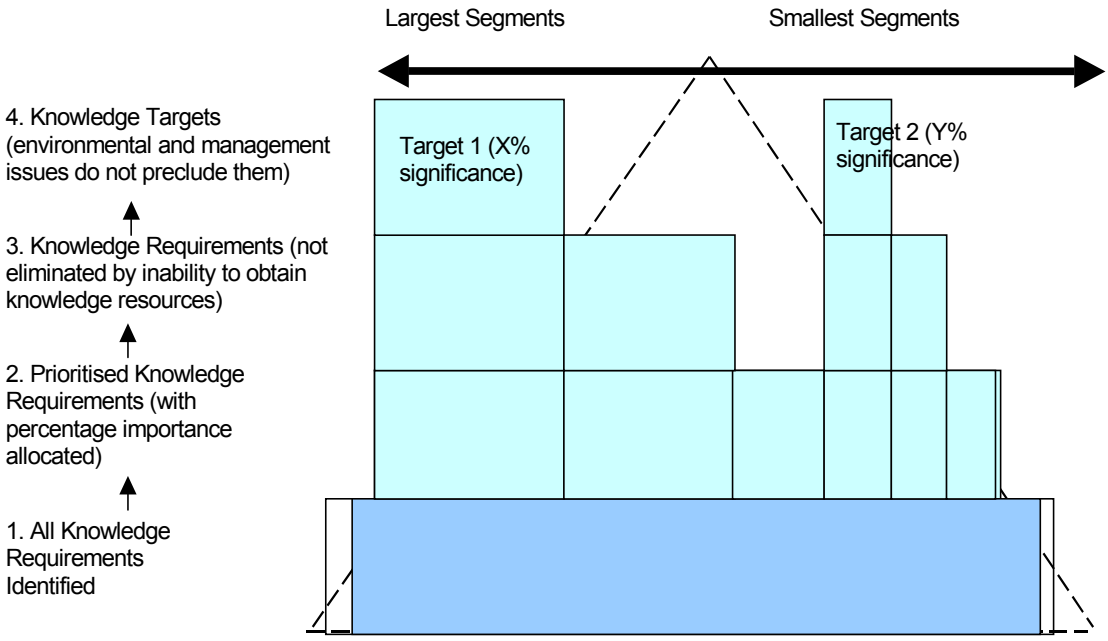

Figure 2: Knowledge targets pyramid

6.2 Knowledge Tree

The Knowledge Tree was an Outcome Visual Tool that derives from SolSkeme and was used in Cycle 1. On the tree are noted key knowledge resources, manipulation and management activities, and environmental influences identified as required to achieve the Targets. The Knowledge Tree was designed to provide a summary of these features for *all* the Targets. The tree is a pictorial backdrop providing an image of the organisation/context as a living organism effected by and affecting its environment (**Figure 3**).

The Formal and Informal Direct Feedback from Cycle 1 suggested that it helped focus thinking on the key knowledge resources, manipulation/managerial activities and environmental influences. Employee B suggested the use of measurements as part of the tool. There was concern as to how the visual tool fitted with the rest of MaKE and, in terms of the visual tool dilemma, it erred on the side of not having sufficient detail and not being clearly enough linked to other components of MaKE. There was no Indirect Feedback although on reflection the Designer had reservations about its usefulness.

In summary, the Designer concluded that although the Knowledge Tree provides a rich descriptive backdrop for information, not enough information could be presented on it and it only loosely integrated with the Knowledge Targets. Therefore the Designer decided to discard the Knowledge Tree for Cycle 2.

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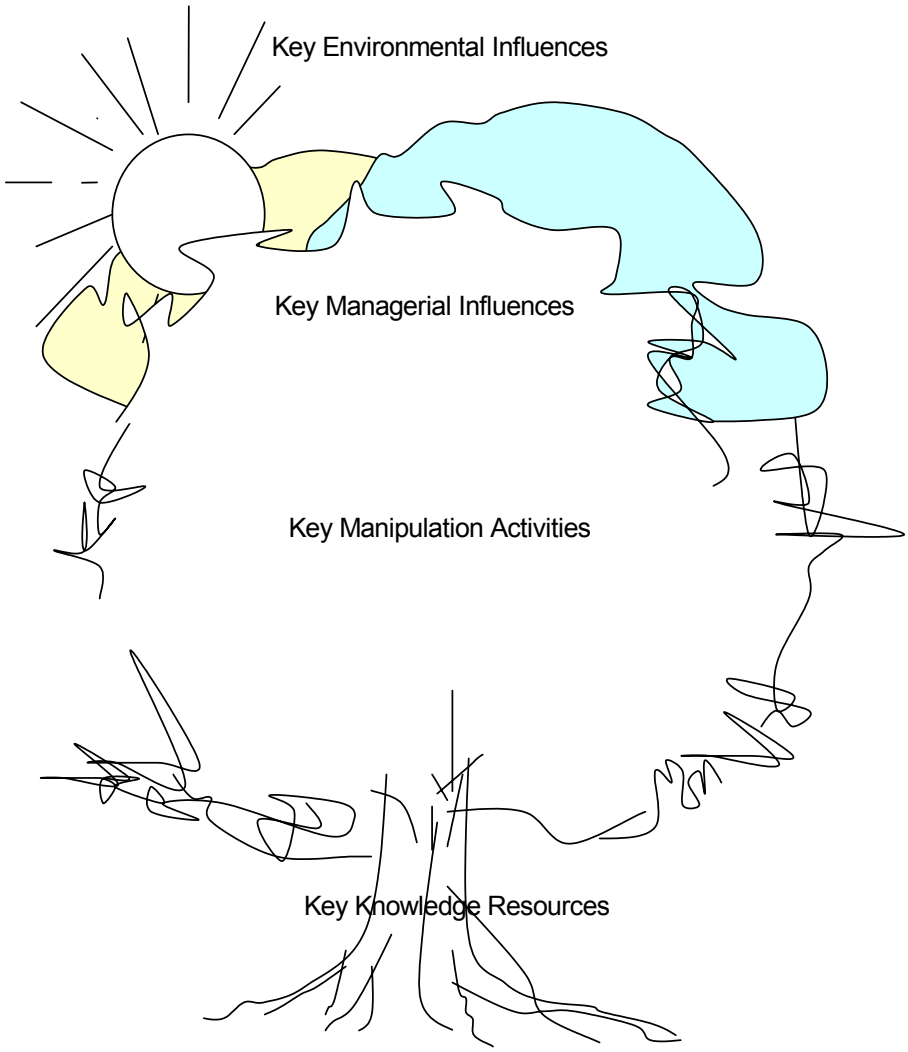

Figure 3: The knowledge tree

6.3 Knowledge block

The Knowledge Block was created between Cycle 1 and Cycle 2. This feature replaced the Knowledge Tree. A simplified version of a Knowledge Block is illustrated in **Figure 4**. Unlike the Knowledge Tree, a Knowledge Block is completed for *each* Target. The idea is to give a detailed breakdown of knowledge resources, manipulation/management activities and environmental influences identified as effecting the achievement of the Target. In the second column each category is broken down into sub-categories that derive from another level of the Three-Fold Framework (Holsapple and Joshi, 2001). In the fourth column suitable measures and indicators for each resource or activity are selected to measure progress in carrying out the activities. Unlike the Knowledge Tree the Knowledge Block is *more closely* linked with the Pyramid and is intended to conjure up the image of a 'block' that helps 'prop up' the Targets in the Pyramid.

There was no Formal Direct Feedback or Indirect Feedback on the Knowledge Block in Cycle 2. However, the Informal Direct Feedback was that the level of detail contained within the Knowledge Blocks and the use of measurements were very helpful. Therefore, in terms of the visual dilemma it was deemed more useful and helpful to participants than the Knowledge Tree. The Designer reflected that the Knowledge Blocks integrated better with the Pyramid than the Knowledge Tree. Employee B and C suggested that an Outcome Visual Tool that summarises the link between the Targets and the detail in the Knowledge Blocks would also help strike the right balance between detail and clarity. This led to the creation of the Linking Overview.

Knowledge Target: **TARGET X**

Category	Sub category	Resource, Activity or Influence	Measure / Indicator
Knowledge Resources			
Manipulation Activities			
Management Activities / Influences			
Environmental Influences			-
			-

Figure 4: Knowledge Block

6.4 Linking overview

The Linking Overview provides a summary of Knowledge Targets and an indication of the types of actions identified to improve KM in the context to which MaKE is applied (**Figure 5**). It cross-refers to Knowledge Blocks that relate to each Target.

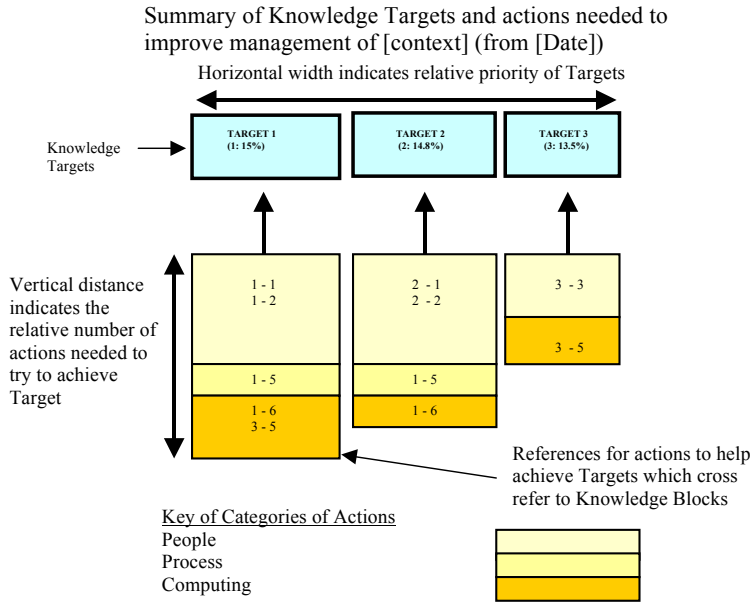

Figure 5: Linking Overview

Figure 5 illustrates a version of the Linking Overview created and presented during the research. In a way the Linking Overview fulfils the function the Knowledge Tree used to perform but now does this by providing a bridge between the Pyramid and Knowledge Blocks. The participants chose the categories of actions (people, process and computing systems) but other categories may be appropriate for other organisations. It was created as a visual tool to help present the outcomes of MaKE although it is untested and may be a visual tool more suited to the organisation for which it was made than for others.

7. Conclusion

Visual tools are widely used in KM and IS for different purposes. However in KM many, although helpful, are often conceptual in nature and need to be developed, applied in practice and refined. Visual tools are normally used to *aid* communication. However, there is a dilemma that often tends to arise in the use of them. This is that in using visual tools complex phenomena may be simplified at the expense of important detail and consequently readers of the tools may be misled.

The findings of the research indicate that there are various things designers of KM

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methods/frameworks need to address when designing visual tools for users in industry. Visual tools used for presenting outcomes of KM work need to *aid* communication in terms of the *purpose(s)* for which they are designed and should be integrated well with other parts of the KM method. There is also a need to strike a balance between the need for simplicity and clarity with sufficient detail. It is also necessary not to use visually rich tools at the expense of practical value.

Reflecting on the feedback on the Outcome Visual Tools of MaKE *as a whole* one can conclude that if the above is done, practitioners can regard visual tools as very helpful for understanding and communicating relatively complex phenomena. Within the context of the development of MaKE the Knowledge Targets Pyramid, Knowledge Block, and the Linking Overview do this more effectively than the Knowledge Tree.

Note about MaKE, funding and authorship
MaKE stands for 'Manage Knowledge Effectively', a KM method designed by the primary author of the paper, Peter Sharp. He wishes to acknowledge that the acronym is not to be confused with a similar acronym 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. Alan Eardley and Hanifa Shah were supervisors in the research and the primary author was provided with scholarship funding by the School of Computing, Staffordshire University.

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