Time for Reflection: Going Back to Autopoiesis to Understand Knowledge Management

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ABSTRACT

The field of Knowledge Management has lots of ideas and models, but the problem lies in that the discipline has no solid foundations on which to build new ideas and developments. A lot of the theory in knowledge management is scientifically unfounded and unproven, possibly a result of the difficulty in testing ideas resulting in numerous debates and leaving little time for new developments in the field. The paper introduces the concept of applying Autopoiesis to the Knowledge Management field in order to provide the discipline with a foundation from which to build.

1. KNOWLEDGE MANAGEMENT

1.1 What can we learn from revisiting the Building Blocks of Knowledge Management?

Knowledge management is a relatively young discipline, and is rapidly evolving with new ideas. Whilst knowledge management can be defined as using knowledge as the key asset to drive organisational survival and success (Jashapara, 2004), numerous methods and perspectives exist for implementing knowledge management systems.

There is general agreement among the academic community that definitions of knowledge have their foundations in the work carried out by Ryle and Polanyi (Ryle, 1949; Polanyi, 1967), providing a logical behaviourist perspective. Polanyi suggests that knowledge exists on a continuum between tacit knowledge and explicit knowledge. Tacit knowledge is explained by Ryle as 'knowing how' whilst explicit knowledge is described as 'knowing that'. Ryle provided the example of a person riding a bike. The person has tacit knowledge in that they know how to stay upright, but often they can not explain what keeps them upright. The main idea behind tacit and explicit knowledge appears to be that 'we can know more than we can tell' (Jashapara, 2004).

Davenport and Prusak (1998) extended the work of Ryle and Polanyi to create a continuum with experience (tacit knowledge) and information (explicit knowledge) at each end. 'Insight', 'values' and 'data' were also added as recognition that 'there is no knowledge which is totally tacit and none without at least some tacit aspect' (Eraut et al., 1998). This approach recognises that whilst a person may not have experience of something, they can still have an insight or information about an experience.

Nonaka (1994), whose work was based on that of Ryle and Polanyi, attempts to show that knowledge can be converted between tacit and explicit form, and vice versa, and be transferred between different people. Whilst recognising this takes place, Nonaka does not provide any framework as to how this might happen or what processes are involved. Nonaka's work is almost holistic in its approach.

Whilst most authors have different views on what knowledge is, an agreement that the ideas are based on the work of Ryle and Polanyi means that regardless of what the finer points of the definition are, there is a common understanding that knowledge can exist on a continuum between tacit and explicit knowledge. An understanding of what knowledge is, allows an analysis of what knowledge management is and how knowledge management has developed.

1.2 The History of Knowledge Management

Metaxiotis et al. (2005) split the history of knowledge management into three generations. The first generation was concerned with defining knowledge management, investigating possible systems and looking at the benefits of such systems. Advances in artificial intelligence also prompted study into how knowledge could be represented and stored. The second generation recognised the influence knowledge management could have in management information systems, for example creating frameworks and instigating organisational change.

The third, and current, generation is based on new insights and practices developed from the second generation. According to Wiig (2002), the third generation is more 'integrated with an enterprise's philosophy, strategy, goals, practices, systems and procedures'. This is in recognition that knowledge management has links wider than information management. The third generation reflects the work of Ryle and Polanyi by emphasising the link between knowing and action (Paraponaris, 2003).

The three generations of knowledge management have given rise to numerous definitions, although two authors have tried to create a definition that encompasses current views. Jashapara (2004) defines knowledge management as:

'the effective learning processes associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriate technology and cultural environments to enhance an organisation's intellectual capital and performance'

and Davenport and Prusak (1998) define knowledge management as:

'concerned with the exploitation and development of the knowledge assets of an organisation with a view to furthering the organisations objectives. The knowledge to be managed includes both explicit, documented knowledge, and tacit, subjective knowledge'

Both of these definitions consider exploiting knowledge, but then deviate to focus on separate things. Jashapara (2004) is more concerned with sharing knowledge and different methods for sharing, whilst Davenport and Prusak (1998) are more concerned with developing and managing knowledge. Whilst both definitions are different, they are complementary and necessary, since without the ability to develop and manage an organisation's knowledge, it is impossible to exploit and share it.

As this paper has shown, knowledge management theory has lots of ideas and different routes for research. However, the problem is that the research is very conceptual, with high level ideas, and needs to be grounded in science to become sufficient for new and necessary improvements in knowledge management.

1.3 People Focused KM

As knowledge management is concerned with people, substantial work was done to develop the idea of knowledge networks, as introduced by Seufert et al. (1999). Based on the idea of networks and social interactions, knowledge networks were defined as 'a number of people, resources and relationships among them, who are assembled in order to accumulate and use knowledge primarily by means of knowledge creation'. This definition implies that people are working together to share knowledge with the common aim of knowledge creation. Seufert et al. (1999) suggest a framework for knowledge networks, but they neglect to suggest a mode

of implementation. This is probably because 'an integrated approach is required which includes both tacit and explicit knowledge' (Seufert et al., 1999)

Schőnstrőm (2005) has since focused on creating knowledge networks because 'the intentional creation of knowledge networks has only, to a limited degree been treated by KM researchers' (Schőnstrőm, 2005). Seufert et al. (1999) identified two types of knowledge networks, intentional and emergent. The work by Schőnstrőm (2005) focuses on intentional networks, because emergent networks cannot be created. Schőnstrőm (2005) identifies three key learning points from the experiment. First, that knowledge activist must exist in the organisation and be willing to act as network coordinators. Second, that knowledge networks must form part of a company's strategy. Top management support is vital in the implementation of any new mode of operating. Third, that knowledge networks are not immune to organisation restructuring. This is simply because the very basis on which the networks are created can be removed or changed.

2. IS THERE A CONSENSUS TO THE FOUNDATIONS OF KM?

Metaxiotis et al. (2005) have reviewed all of the main agreements and disagreements in the field of knowledge management. The authors suggest that there are agreements with regards to the definition of knowledge management, the benefits of knowledge management, the factors influencing knowledge management and how learning is associated with knowledge management. However, the review so far has shown that there is general disagreement among academics about what constitutes a definition of knowledge management, but it could be that Metaxiotis et al. (2005) are commenting about the complexity and ambiguity surrounding the field.

Among disagreements, Metaxiotis et al. (2005) list frameworks for implementation, whether Information Technology (IT) is a central interest to knowledge management and if knowledge can actually be managed. These are important disagreements. For example, if no framework can be agreed upon, then no system can ever be developed and implemented. With regards to IT, whilst it may not be central to a knowledge management system, it should be essential to implementing a system, especially in firms of considerable size. It is generally accepted that IT will play some part in knowledge management because many authors (Holsapple, 2005; Junnarkar and Brown, 1997) have written about the application of software in knowledge management. The last disagreement Metaxiotis et al. (2005) mention is perhaps the most important; if knowledge can never be managed, then all that can be done is to create systems that can facilitate knowledge sharing among employees.

Despite knowledge management being a relatively young field, organisational learning is a more mature area which has been integrated into knowledge management (Jashapara, 2004). Organisational learning is defined by Senge (1990) as:

'Organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to learn together'

The principle of this definition is that employees must be continually learning so that an organisation can learn. Whilst this is true, employee learning does not happen in isolation. This definition also recognises that there must be an interaction and sharing of knowledge between employees for learning to make a difference organisationally.

3. ORGANISATIONAL LEARNING

The learning organisation is a new concept. Yeo (2005) defines a learning organisation as an organisation that "embraces the importance of collective learning as it draws on a larger dimension of internal and external environments." The difference between organisational learning and a learning organisation is that organisational learning is a process an organisation goes through to learn, whereas a learning organisation is a type of organisation (Yeo, 2005). The implication is that whilst all organisations can learn, only learning organisations are continually learning and improving. There is an assumption that learning organisations will be better able to manage knowledge.

Organisational learning is categorised by three stages (Yeo, 2005). The first stage is concerned with individual learning, the second stage with people solving problems by using other team members. The third stage is concerned with the external environment, and how people try to solve problems with respect to external resources. The only criticism is that Yeo does not provide any detail on how the three stages occur or the processes in them.

One important concept in organisational learning is single and double loop learning, originally developed by Argyris and Schon (1978). Single loop learning occurs when an entity modifies their behaviour when there is a difference between expected and actual outcomes. In comparison, double loop learning, occurs when an entity revisits the assumptions and values that led to the behaviour in the first place (Smith, 2001). It is important to consider single and double loop learning because these theories provide the foundations which explain how people learn, and ultimately how organisations learn.

Kim (1993) created a model of organisational learning based on Argyris and Schon's (1978) theory of single and double loop learning. Kim's (1993) integrated model shows the link between individual and organisational learning and all the factors important in the transfer of knowledge.

4. BIOLOGICAL APPROACHES TO KNOWLEDGE MANAGEMENT

Maula (2000) and Hall (2005) have taken a biological approach to knowledge management and organisational learning. Maula (2000) suggests that since organisations are 'living systems that reproduce themselves' the theory of autopoiesis can be applied to them. Maula considers the organisation as a whole with a corporate memory and one boundary, and says that as organisations portray certain characteristics, they are autopoietic. However, Maula (2000) does not provide any detailed analysis to validate his work, or the claim that organisations are living systems.

Hall (2005) gives a more detailed application of autopoiesis to organisations, by explaining how organisations meet the six criteria necessary to be autopoietic, as identified by Varela et al. (1974). Although Hall (2005), like Maula (2000), still only considers the organisation as a whole, and does not consider processes within the organisation.

5. CURRENT KNOWLEDGE MANAGEMENT GAPS

Given the current literature there seems to be several gaps that have been identified and these are:

1. No accepted definition of knowledge or knowledge management
2. No explanation of whether knowledge can actually be managed
3. Disagreements on role and use of IT in knowledge management (Metaxiotis et al., 2005)
4. No commonly accepted framework/toolkit
5. The lack of actual implementations (Schőnstrőm, 2005)
6. Superficial biological approaches (Hall, 2005; Maula, 2000)

There may be numerous reasons why no or very little literature has been found on these topics. First, the lack of agreement on areas such as how knowledge is composed means no consensus can be gained to enable further research. Further research in other disciplines may be needed, for example human cognition. Human cognition is an important area because if it is possible to understand how people learn and generate knowledge, it will be easier to create a system based on that knowledge. There are also difficulties regarding the nature of organisations. Unless an organisation's exact structure can be recorded, it will be impossible to prescribe a knowledge management tool. A third problem occurs with autopoiesis itself. As autopoiesis is such a complex theory, many authors have either applied it to knowledge management at the conceptually very high level, or indicated that it is too complicated, and needs to be significantly simplified to be applied to organisations. However, this could be due to a lack of understanding about autopoiesis.

6. WHAT IS AUTOPOIESIS?

Autopoiesis is a theory which shows what it means to be living. Previously, living entities had been defined by listing their characteristics. However, the counter argument against this approach is that if a machine could mimic these characteristics then it should be considered living. This is evidently wrong, and autopoiesis provides the new approach needed. Instead of defining entities by

their characteristics, Maturana and Varela (1980) define entities by the relationship between the components in the entity. There is also an assumption that living systems are discrete, autonomous entities.

Combining these two ideas, Maturana and Varela (1980) propose that it is the relationship between the processes in living system that realises the entity's ability to be discrete, autonomous and self producing. Autopoiesis could then be defined as the maintenance of an entity's organisation, or relationships between its processes. Maturana and Varela (1980) go onto explain that the network of processes is self producing, in other words the network of processes realises its own existence.

In defining autopoiesis, Maturana and Varela are careful to distinguish between organisation and structure (Maturana and Varela, 1998). Organisation refers to the relationship between the processes that realise the entity, whereas structure refers to the actual components within the entity. For example, when considering living entities, they all have the same organisation, which is autopoietic, but they have different structures, enabling observers to see them as different animals/birds/insects.

When developing the theory of autopoiesis, it was also necessary to define how such entities would interact with each other, in relation to their organisation and structure. The theory of how autopoietic entities interact was developed in structural coupling. This states that any entity, autopoietic or not, can only trigger change in an autopoietic entity. In other words, the autopoietic entity can only change according to its structure.

7. CAN AUTOPOIESIS SOLVE THE PROBLEMS WITH KM?

Preliminary research by Parboteeah and Jackson (2006) shows how autopoiesis can be applied to knowledge management, namely models of organisational learning. The authors are instrumental in breaking down autopoiesis to be useful in knowledge management. After successfully creating a model of autopoietic organisational learning, they propose areas of research that could yield useful results. These areas include creating systems based on their proposed model and other areas of knowledge management to which autopoiesis can be applied.

Several other attempts have been made to apply autopoiesis to organisations (Hall, 2005; Limone and Bastias, 2006), but they have been superficial and avoided actual implementation issues.

In applying autopoiesis to knowledge management, it is hoped the phenomenology normally associated with living systems: self reproduction, the spontaneous creation/destruction of new entities and self specification, can be applied to knowledge management. The self reproduction aspects of living systems could give new insights into knowledge creation, and how a knowledge management system could aid this. Alternatively, this aspect could foster a knowledge management system that will aid or promote innovation and the appropriate culture.

There is also an aspect of autopoiesis that looks at the interactions between two or more entities, called structural coupling. Structural coupling could also be used to enhance a knowledge management systems ability to create knowledge. However, structural coupling could be more suited to applications looking at the issue of collaboration, and the sharing of knowledge among employees.

With an increasing number of organisations going global in their operations, a knowledge management system that can resolve cultural issues will be increasingly important. Culture, should not be an issue with an autopoietic knowledge management system because the system will be self-specifying, meaning that any knowledge stored will include any assumptions/cultural aspects.

Autopoiesis could also be used as a validation tool for knowledge management models. This could prove useful in determining if some models are better than others, if models can be improved after applying autopoiesis, or simply by reducing the number of potential models in circulation.

This research aims to further the work of Parboteeah and Jackson (2006) and will aim to determine the usefulness and practicality of applying autopoiesis to knowledge management. The research will be carried in five stages. The first stage will attempt to formally specify autopoiesis, and hence make it more accessible, and stage two will create tools to model organisations and knowledge management systems. Stage two sets the ground work for stage three which will look at creating an autopoietic knowledge management system at an organisation which already has a knowledge management system. Stage four will attempt to create a knowledge management for an organisation that has no formal knowledge management system. The final stage will aim to create a framework or toolkit to enable future organisations to create an autopoietic knowledge management system.

8. CONCLUSION

Following a review of current knowledge management literature, numerous problems were identified, which included a lack of reported implementations, a lack of a common framework and a lot of unfounded ideas. The field of knowledge management would benefit from unifying all of the current ideas into one model. This unifying model would help to create a foundation for knowledge management from which new ideas can be developed and so helping the field of knowledge management to move forward.

As has been identified by this paper, the current work on autopoiesis is too abstract and conceptual to be of substantial use in knowledge management. Formalising autopoiesis will help to make autopoiesis and its associated theories more accessible and more easily applied to other disciplines. It is hoped that using autopoiesis in knowledge management will help to create a deeper understanding of issues in knowledge management, such as what constitutes knowledge and how it can be mapped. These are all ideas which the authors hope will be addressed by the ongoing research that is taking place.

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