

The Role of Knowledge Management in an Organisation's Sustainable Development

Rosemary Van Der Meer^a, Dr Suku Sinnappan^b

^{ab} Dept of IT Systems and Multimedia, Faculty of Higher Education,
Swinburne University of Technology, 3140 Lilydale, Victoria AUSTRALIA
Tel : 613-92157192, Fax : 613-92157070

^aE-mail : rvandermeer@swin.edu.au

^bE-mail : ssinnappan@swin.edu.au

ABSTRACT

This paper intends to study the role that Knowledge Management has in development of sustainable organisations. Particularly, the researchers propose to examine key factors in the use of Knowledge Management and sustainable development that could be used to provide a measure in achieving sustainability. The research project is an exploratory study using a case study approach due to the limited amount of literature available on the use of Knowledge Management in sustainable development. The significance of this study is the opportunity to see how much impact Knowledge Management can make in the process of re-engineering an organisation along sustainable goals. It also contributes to the body of knowledge being put forward on the role of IT in sustainable development.

Keywords

Knowledge Management, Sustainability, Information Technology, Triple Bottom Line

1.0 INTRODUCTION

The concept of dwindling natural resources, global warming and sustainable development has drawn more attention recently. Organisations are beginning to recognise the importance of adapting to the natural environment and respond to changes in the global environment and the reduction in natural resources (Haigh and Griffiths 2008, Pratt 2006, Norman and McDonald 2004, Bansal 2002 and Sheats 2000). There are organisations that are counting their success not just in terms of economic success but in utilising all three factors of the Triple Bottom Line (TBL) - economical, social and environmental. Increasingly there has also been a growing awareness of the role Information Technology (IT) in sustainable development. IT can provide many opportunities for the development of sustainability through the processing of information to maximise efficiency (Waage, Shah and Girshick 2003). However, some regard IT as being both a problem and a solution in an organisations goal to achieve sustainable development.

IT equipment requires power, especially in the area of data storage. Not only that, but the equipment produces heat and requires extensive cooling systems to allow the equipment to continue running. Storage and data centre power usage is a major cost for business. The Gartner group predicts that by the end of 2008, nearly 50% of data centres worldwide will struggle to get sufficient power and cooling to support high-density equipment (cited in Adshead 2007). However, while there are discussions of the role IT plays in sustainable development (specifically on how it can process information to improve processes and make organisations more efficient), there are almost no literature on the role of Knowledge Management (KM) in achieving improved efficiency. Yet ironically, processing information is the main goal of knowledge management. This gap presents an opportunity, which this paper tries to conceptualise and explore. The researchers aim is to examine the role KM plays in an organisation's pursuit of sustainable development. In addition, the paper discusses what key factors, such as TBL, could be used to measure the success of KM in the development of a sustainable organisation.

2.0 IT, KM AND SUSTAINABILITY

Increasingly, both business and government are becoming more aware of the need to focus on their impact on the environment, and not just their economic growth. The literature indicates that, part of sustainable development is the developing interest in the TBL. The TBL uses not just economic measures to judge an organisation's success but also social and environmental impact measures. Traditionally, most organisations focused on only the economic measures. However, the growing interest in sustainable development has also seen a growing interest in TBL (Jamali 2006). While it has become prominent, that does not mean that organisations are quick to respond to sustainable development or TBL. Many organisations are slow to react and respond to the new trend (Pratt 2006, Driscoll 2007 and Rust 2007). Many indicate that IT is seen as having a vital role in sustainable development as both a part of the problem and a solution. Operation of data centres, multiple computers left on at all times, the air conditioning required to cool data centres and buildings all use energy and are all made of

predominantly plastics and other materials, such as lead (Adshead 2007). This combination of the materials and energy used has an impact on dwindling natural resources and on the refuse left behind through pollution and landfill.

Our main interest though is in how IT and specifically KM can be part of the solution. Many of the technologies that exist when coupled with innovation in business can reduce environmental impacts while increasing the quality of services provided and can be done with profitable returns (Falk and Ryan 2007, Pratt 2006, Jauhari 2005 and Sheats 2000). For example, IT can also provide many opportunities for corporate firms to inculcate sustainable practices as depicted in Table 1, which was improvised from information mainly gathered from Waage, Shah and Girshick 2003. However, when it comes to the use of KM in sustainable development, there is very little literature available. There are almost no articles examining the use of KM specifically in sustainable development. The only literature that provides any help is within a few articles on the role of IT in sustainable development, which discusses approaches based on KM but not identified as being KM. They are listed under the wider scope of IT. Many of the suggestions listed in the table, are KM solutions such as, capturing information on how ecological systems work, improving logistics tracking, creating 'green' materials databases and capturing sustainability information flows. When examining what facilities are available now, and what options may be available in the near future, again there is little evidence in the literature. There have been no studies on the role or abilities of KM in assisting organisations in their pursuit of sustainable development. However, given the increasing number of literature in the area of IT and sustainable development, there may be more relevant literature to sharpen the focus of the research when the subsequent literature review is carried out.

3.0 RESEARCH QUESTIONS

In general, this paper intends to examine the role KM has in helping an organisation to achieve sustainable development.

Table 1: Corporate sustainability efforts via IT implementation

Sustainable IT Implementation	Researchers	Firms Involved
Maximising efficiency with sensors to adjust equipment and reduce power usage.	Waage, Shah and Girshick 2003; Sheats 2000; Parkinson 2007	XEROX, Celestica, Weirton Steel Corporation, Toyota Prius, HSBC
IT systems that capture information about how ecological systems work, that can then be used to build better businesses.		Interface, CH2M HILL, BiosGroup
Tracking and integrating	Waage, Shah	Ecos

Sustainable IT Implementation	Researchers	Firms Involved
different types of information related to dynamics within environmental, social and economic systems that affect the business.	amd Girshick 2003; Gedda 2007; M2PressWIRE 2007; Curzons and Cunningham 2001	Technologies, DuPont, City CarShare, Hewlett Packard, Conservation International and Intel, Lawson Software, GlaxoKlineSmith
Improving logistics tracking for reverse logistics and improved supply chain management to reduce waste.	Waage, Shah and Girshick 2003	Estee Lauder, Home Depot, Interface
Tracking and enabling compliance with regulations.		
Capturing sustainability information flows.		Ecos Technologies, Natural Logic
Creating 'green chemistry' and sustainable materials quality databases and services.		
Changes in software to allow the managing of sustainable development efforts.		Estee Lauder, Ecos Technologies, Greenware, Ecostream
Facilitating sustainability-oriented supply chain system decision making.		Estee Lauder, Home Depot, Timberland, Unisys
Increased usage of mobile computing devices can increase the use of telecommuting to reduce the amount of travel field staff do, reduce the amount of real estate required for offices and emissions through transport for workers.	Gedda 2007	AT&T, Investa

However, specifically, below are the research questions to be explored:

- Does KM contribute to an organisations attempt to achieve sustainable development. If so, can this be measured by TBL factors.
- Are the types KM processes employed within an organisation able to make a difference in achieving sustainability?
- Is the development of the ISO 14000 series of standards, an option for measuring KM's role in sustainable development?

The intended sample of the research is to examine several manufacturing organisations. Manufacturing organisations make an appropriate focus group as they deal predominantly in raw materials to manufacture their products.

Many of these raw materials are based on dwindling natural resources. Manufacturing organisations that

pursue sustainable development practices such as closed-loop or reverse logistics can achieve considerable returns. These considerable returns should improve the ability to identify the impact KM has on the process. The use of manufacturing firms can also be used to draw parallels with many other types of organisations. This allows the research findings to form a basis for these other organisations to consider in their own re-engineering processes.

The scope of this research project is to examine a number of organisations that are:

- Attempting to develop sustainable practices within their organisation.
- And have a number of KM processes in place within the organisation.

At this stage, there are no definite theories or hypotheses developed beyond the general theory that KM can make a contribution in developing a sustainable enterprise. The limited amount of literature on the topic does not provide any basis to form a theory. As the research progresses, more specific theories may be identified (Neuman 2003).

4.0 RESEARCH DESIGN AND METHODOLOGY

The research design to be used for this exploratory study is qualitative. In a qualitative approach the researcher does not narrow the focus to a specific question but use an inquisitive approach to develop a perspective on what is occurring (Neuman 2003). Thus, we approach to address the gap by adopting an exploratory methodology to analyse the 'newness' of situation via case studies with the understanding that subsequent research should provide conclusive evidence. A case study is used where the researcher investigates one or more organisations or entities in depth (Neuman 2003 and Zikmund 2003). Further, it allows for the study of a sequence of events to identify the relationship between the functions or entities. The other factor of a case study is that it is carried out over a period of time (Neuman 2003). This period of time allows the researcher to observe the changing behaviour or attitudes within the organisations or entities.

In the attempt to understand the role of KM in an organisation's sustainable development, the case study approach provides the ability to study a few organisations in their process of re-engineering to a more sustained development and compare the sequence of events on that path. This allows us to see what part KM played in this process and was that part a significant factor or only a minor addition. There is the flexibility to adapt to any unexpected issues that may occur during the research phase, and to develop theories on what has occurred. The case study approach also provides the ability to observe the organisations over time. Re-engineering an organisation to achieve a more sustainable approach to manufacturing is not an overnight process. Any major change in an organisation requires planning and time before results are achieved. By using a case study we are

able to observe the organisations over the process of re-engineering from planning to implementation rather than just observing the finished product. The researchers will action the case study through field research. Field research is used where there is a loosely formulated topic at the beginning of the study - best used when the research question involves learning about or understanding how something occurs (Neuman 2003). In the case of this study, it is how does KM affect the process of achieving sustainable development in an organisation?

The advantage of using field research in this project is that it has no fixed set of techniques but instead adopts various methods to obtain the knowledge (Neuman 2003). It is much more flexible than other data collection methods used in quantitative research but does not prevent us from using a method that is quantitative within the qualitative project. This allows the researchers to undertake not just observation of the organisations in the study but also to use interviews or even a survey should the theories develop in that way over the course of the project. Within this study, the field research approach allows us to observe at a number of manufacturing organisations to watch the process of change in their development of sustainable processes. As the observation progresses and trust is established between the members being observed and the researcher, we can then begin to ask questions or conduct interviews to clarify the thoughts or descriptions of those involved in the process. This ability could assist in narrowing the focus of any theories developed.

As it is impossible to study all organisations, a sample group must be established from which parallel comparisons can be drawn in related areas. There are a number of different types of sampling that can be carried out in qualitative research. This research project involves a case study analysis. The basis used to pick the organisations that suit the case are:

- The organisation must be a manufacturing organisation such as, Shell, Ford, and ALCOA. Manufacturing organisations have been chosen as they use the most raw materials and may gain the most returns by implementing sustained development strategies.
- The organisation must be of a medium to large size. Smaller organisations may not have the resources for sustainable development or the public perception requiring a change to meet social requirements. Smaller organisations may also not have visible KM processes established within the organisation.
- The organisation must have KM processes that are visible, in operation and used.
- The organisation must be planning a sustainable development project to coincide with the timeframe of the research project. Observation on most of the project is required to establish the role of KM in the process.

- The organisation must be willing to take part and allow the results of the study to be published, though with organisation names concealed.

5.0 CONCEPTUAL FRAMEWORK

A conceptual framework is a diagram that depicts the variables in the research and the relationship among them (*Conceptual Frameworks Learning Object* 2008). Figure 1 depicts the conceptual framework for this research project, which uses a qualitative approach. In conceptualising a qualitative approach, the researchers refine working ideas (Neuman 2003).

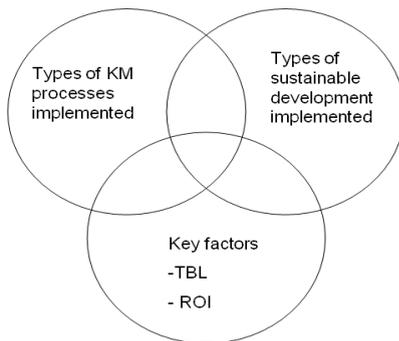


Figure 1: *Conceptual Framework for the role of KM in Sustainable Development*

The main variables, or ideas, that affect the study are the types of KM processes an organisation has in place, the types of sustainable development they are trying to achieve and the key factors that could be used to measure the contribution of KMs role in the sustainable development process. Alignment of these ideas could determine if KM can play a role and affect the development of the sustainable enterprise. The effect of key factors could determine if it is possible to establish measures for future studies. This conceptual framework is straightforward. A grounded theory approach is used to develop the theories as the research unfolds. Further research should highlight other variables that can affect the project.

6.0 DISCUSSIONS AND FUTURE DIRECTION

6.1 Significance

The significance of this study lies in the understanding on how much of a role, if any, the managing of knowledge has when making decisions and exploring options in re-engineering an organisation for sustainable development. Through this study the researchers aim to find evidence that the use of KM does contribute to an understanding of where an organisation is wasting resources and where they can make improvements that benefit the organisation environmentally, socially, and economically. A further contribution of the study is identifying the key factors that lead to KM contributing to sustainable development.

These key factors could then be used as a method for measuring the success of KM in future studies. This would be an important development in encouraging organisations to look not just to their main value chain processes for answers to implementing sustainable development but also to the supportive processes such as KM. Further more, this study adds to the limited amount of empirical work on IT and sustainable development and begins the empirical work on KM and sustainable development.

6.2 Limitations and Constraints

This research does examine whether KM helps an organisation achieve sustainable development? Within this topic, it also examines the KM processes and implemented sustainable development projects. Further, the key factors that can be used for future measures of success are also explored.

This project does examine whether KM helps an organisation achieve sustainable development. Within this topic, it also examines:

- What KM processes are in place at the organisation?
- What sustainable development project is being implemented?
- What key factors are there, those can be used for future measures of success?

However the project does not examine:

- Whether these effects apply to all industries or only to those in manufacturing.
- The other factors that contribute to the implementation of the sustained development project except in the broad understanding of the project.
- All projects that the organisation is undertaking. Only one project per organisation that fits within the timeframe of the study.

The constraints on this project are mainly the size and location of the sample group. Because of the time restraints, the sample size should be no more than three to five organisations. The location is to be determined on the location of the research once the project is accepted. This list of limitations and constraints is incomplete. As much of the theory and understanding of the research will be only found as the project unfolds, new limitations or constraints may be added when a better understanding is achieved.

6.3 Conclusion

This paper has shown that there is a lack of literature in the area of KM and sustainable development. However, the literature has also shown that there are many firms undertaking IT implementation towards their sustainable development and that many of these projects have a basis in KM, which presents a significant gap and opportunity to be explored.

The limited amount of research provides little support for establishing theories on the role KM plays in sustainable development for an organisation. The proposed methods for the study are dynamic allowing the theories to evolve as understanding of the key factors is developed. The establishment of a clear understanding of KM's contribution to sustainable development and the identification of the key factors that drive this would allow organisations to measure that contribution in their re-engineering process. This could see KM processes leading organisational redesign rather than supporting the redesign.

REFERENCES

- Adshead, A. (2007). The Business Case for Green Storage, *Computer Weekly*.
- Bansal, P. (2002). The Corporate Challenge of Sustainable Development, *Academy of Management Executive*, vol. 16, issue 2.
- Conceptual Frameworks Learning Object* 2008, University of Ontario Institute of Technology, viewed 26 February 2008, http://innovation.dcuoit.ca/cloe/lo/cf/CF_LO_content.html.
- Curzons, AD, and Cunningham, VL . (2001). Developing GSK's Green Technology Guidance: Methodology for Case-Scenario Comparison of Technologies, *Clean Technologies and Environmental Policy*, vol. 4, issue 1, p44-53.
- Driscoll, S. (2007). Enterprises reluctant to go Green with Storage, *eWeek*, vol. 24, issue 32 .
- Falk, J and Ryan, C (2007). Inventing A Sustainable Future: Australia and the Challenge of Eco-Innovation, *Futures*, vol. 39, issue 2/3.
- Haigh, N and Griffiths, A. (2008). E-Government and Environmental Sustainability: Results from Three Australian Cases, *Electronic Government, An International Journal*, vol. 5, issue 1.
- Gedda, R. (2007). Green-eyed CIOs Lift Business Acumen', *ComputerWorld*.
- Jamali, D. (2006). Insights into Triple Bottom Line Integration from a Learning Organisation Perspective, *Business Process Management Journal*, vol. 12, issue 6.
- Jauhari, V. (2005). Information Technology, Corporate Business Firms and Sustainable Development: Lessons from Cases of Success from India. *Journal of Services Research*, vol. 5, issue 2.
- Lawson to Help Companies Use Information Technology to Manage Green and Social Responsibility Initiatives, *M2PressWIRE*, 06 March 2007
- Neuman, WL. (2003). *Social Research Methods – Qualitative and Quantitative Approaches*, 5th edn, Allyn and Bacon, Sydney
- Norman, W and MacDonald, C . (2004). Getting to the Bottom of triple Bottom Line, *Business Ethics Quarterly*, vol. 14, issue 2
- Parkinson, G. (2007). Office Clean-Up, *Bulletin with Newsweek*, vol. 125, issue 6562, p27
- Pratt, MK. (2006). It's Not Easy Being Green, *ComputerWorld*, vol. 40, issue 12
- Punch, KF. (2003). *Developing Effective Research Proposals*, 4th edn, SAGE Publications, London
- Rust, L (2007). Green IT Sits Low on Aussie Agendas, *ComputerWorld*
- Sheats, JR. (2000). Information Technology, Sustainable Development and Developing Nations, *Greener Management International*, issue 32
- Waage, S, Shah, R and Girshick, S (2003). Information Technology and Sustainability: Enabling the Future, *International Journal of Corporate Sustainability*, vol. 10, issue 4
- Zikmund WG. (2003). *Business Research Methods*, 7th edn, Thomson South-Western, Ohio, USA