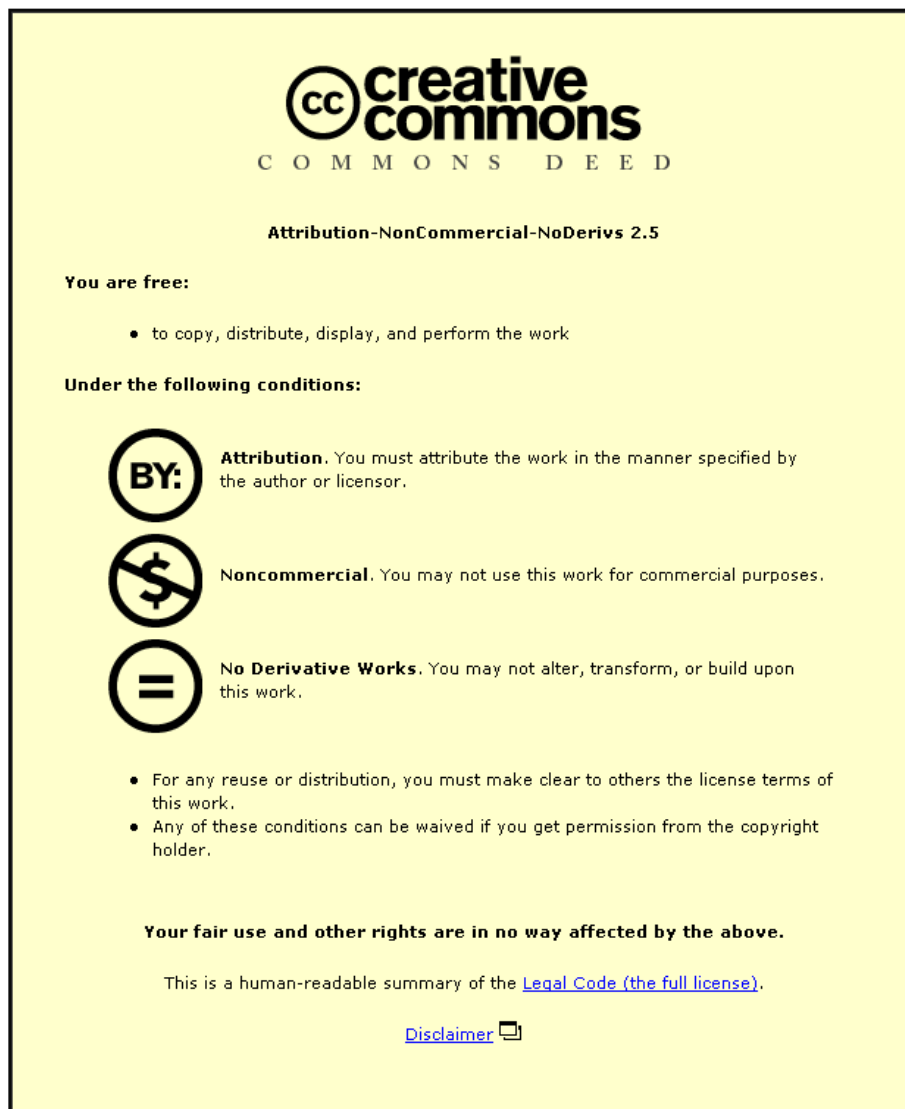


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Knowledge Management Tool Selection

by
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Abstract

Dawson (2009) suggested a twelve step methodology for implementing knowledge management solutions following research which showed that implementing knowledge management solutions was not as successful as expected. This thesis investigates the third of this twelve step methodology which requires finding a knowledge management solution in the context of the problem. The aim of the research is to determine a methodology that will provide a systematic way for managers to select an appropriate knowledge management tool given a particular working environment.

Two organisations are investigated to confirm that there is a need for a systematic methodology for selecting knowledge management tools and how a methodology may help in achieving selecting an appropriate tool. This investigation is carried out using case studies, action research and interviews and results in discovering that organisations do not have a systematic method for selecting tools which leads to tools being selected haphazardly and not always successfully.

Two tools are developed to aid a manager in selecting a knowledge management tool: the House of Knowledge Management Tool Selection and the Knowledge Management Tool Classification Grid. The House tool helps to identify the knowledge problem being solved and evaluates all potential knowledge management tools against the problem. The barriers to the potential success of the tools are also examined. The grid identifies potential tools by classifying them against knowledge problems.

The two tools are further refined and developed using the two organisations as case studies to demonstrate how and when the tools can be used. This leads to development of the Barrier House and the Evaluation Grid.

A framework and associated methodology are then developed that can be used as a guide to using the tools, offering a systematic approach to selecting knowledge management tools given any environment and thus accomplishing the aim of the thesis.

Keywords: knowledge management, knowledge management tools, tool selection, tool classification, organisational knowledge management, case study, framework, methodology.

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List of Publications

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HOLLAND, S. and DAWSON, R.J., 2010. Classification of tools for quality knowledge management. *Proceedings of Software Quality Management XVIII: Quality Issues for Today*, pp.53-64.

HOLLAND, S.J. And DAWSON, R.J., 2009. Finding the right tool for a quality knowledge management solution. *Proceedings of the Software Quality Management XVII : Software Quality in the 21st Century*, pp.67-78.

HOLLAND, S. and DAWSON, R., 2010. Classification and selection of tools for quality knowledge management. *Software Quality Journal*, pp. 1-17.

Awaiting confirmation

HOLLAND, S. and DAWSON, R.. The need for a systematic approach to knowledge management tool selection. *International Journal of Human Capital and IT Professionals*

CHAPTER 1

INTRODUCTION

This chapter introduces the thesis. The research topic is presented and the motivation for carrying out the work is discussed. The aims and objectives are announced and an overview of the contents of the chapters and the layout of the thesis is established.

1.1 Research Motivation

Dawson (2007) reported in his keynote paper at the Software Quality Management conference 2007 that knowledge management initiatives do not always give the results that were expected with many ending in failure. Various issues and barriers have been uncovered that stand in the way of successful implementation of knowledge management solutions. To overcome this, Dawson (2009) proposed a twelve step methodology for implementing a successful knowledge management solution. The third of those twelve steps states:

‘Find a knowledge management solution in the context of the problem’

Dawson (2009) showed that the knowledge management tool that was selected needed to address a specific recognised problem that existed in the organisation, in order to provide the incentive for employees to use new tools and be more accepting of the change. The example given by Dawson also highlighted that a knowledge management solution may not necessarily be a standard knowledge management tool. In this case it was virtual reality software that provided the successful solution to a knowledge problem.

Dawson (2009) did not indicate any means that could be used to carry out the third step of the methodology to implement a knowledge management solution. This thesis proposes to address this issue by examining how a knowledge management tool

could be selected by an organisation that would lead to a successful implementation of the knowledge management initiative.

1.2 Aims and Objectives

The following are the aims and objectives for this thesis.

1.2.1 Aims

The aim for the research project is:

To determine a methodology for identifying the appropriate knowledge management tools for any particular working environment.

1.2.2 Objectives

To meet the aim of the research the following objectives will be fulfilled:

1. To carry out a literature review to determine
 - a. how organisations are approaching knowledge management
 - b. what tools and techniques are associated with knowledge management
 - c. how these tools are currently selected
 - d. what methodologies exist for selecting these tools
 - e. how successful these tools and techniques are at delivering the expected outcomes
 - f. what barriers to successful implementation of knowledge management have been found
 - g. what gaps exist in the literature that could be further examined
2. To discover if there is a need for a methodology to select knowledge management tools
3. Determine current methods and best practice in use in the selected companies today. The following will be investigated:
 - a. How tools are selected for use in organisations
 - b. How tools are being introduced into organisations

- c. Which tools are successful and which tools fail
 - d. Are tools being managed or are they left to run themselves
 - e. If there is need to be able to systematically evaluate tools and techniques
 - f. If there is a systematic way of evaluating knowledge management tools already being used
4. Develop a tool or selection of tools to aid a knowledge manager to identify knowledge management tools to be used in the manager's own environment.
 5. Test the toolset developed in Objective 4 to further develop and refine the tools.
 6. Define a framework and an associated methodology for the use of the toolset developed in objectives 4 and 5.
 7. Evaluate the potential effectiveness of the tools in real working environments.

1.3 Research Approach and Selected Organisations

To achieve the aim and objectives that have been set out, the research starts by investigating how organisations approach selecting and implementing knowledge management solutions. By examining how organisations select knowledge management tools the research can show if businesses actually have a methodology for selecting tools already and, if not, if one is needed. The investigation into the methods and processes used by organisations to select knowledge management tools is to ascertain how successful organisations are at selecting a knowledge management tool. The study is conducted to establish if there is a need for a methodology to select knowledge management tools and what topics are required to be taken into consideration in order to achieve a successful outcome.

The approach taken to investigate the organisations comprises of action research and case study analysis. Interviews have been carried out in the selected organisations in order to provide an understanding of the issues found by users in connection with the knowledge management tools that they use.

The aim was then for a toolset to be developed that would aid the business manager in finding a knowledge management solution for an identified problem that can be adapted to any particular context. This toolset could then be the basis of a systematic

methodology to find a suitable knowledge management tool giving an appropriate solution in the context of the problem.

The tools need to be simple to use, such that managers in many different disciplines could use them, and flexible such that they could use the tools on a wide variety of problems. For this purpose potential diagrammatic tools that could be implemented on a drawing package or spreadsheet were examined as these are familiar basic technologies that managers use.

Several organisations were approached with a view to finding suitable case studies. The suitability of a case study is dependent on the organisation being willing to allow access to the required material as well as being involved in selecting knowledge management tools. Time is also an issue. The timeframe of the thesis and the case study need to coincide and the workers at the organisations need to have the time to spend answering questions regarding the knowledge management tools. The organisations targeted were those that were available and willing to take part, and the two organisations that eventually made up the cases studies were very different types of organisations.

The two organisations involved in this thesis are Nottinghamshire County Council and AstraZeneca. The council is a public sector organisation heavily influenced by government issues and the present economic climate, whereas AstraZeneca is a private sector organisation in the pharmaceutical industry. The two organisations differ in size, location and business focus. Nottingham County Council has around 12000 employees compared to AstraZeneca's 61000 people. The council is obviously based in UK with AstraZeneca located over fourteen sites in eight different countries. AstraZeneca focusses on research and development of medicines while the council provides public services to the local community. These two very different organisations both, however, recognise a need to use knowledge management tools. This research discovers how they approach selecting these tools and how successful the selected tools are.

1.4 Chapter Outline

The following is a summary of the chapters that are in the thesis.

Chapter 1 – Introduction

This is an introduction to the thesis outlining the motivation for the research, the aim and objectives and summarising the chapters of the thesis.

Chapter 2 - Literature review

This chapter meets objective one set out above. The literature review covers:

- What is Knowledge management
- Knowledge management and organisations
- What are knowledge management tools
- Classification of knowledge management tools
- How knowledge management tools are selected
- Success and failure of knowledge management tools
- Barriers to successful knowledge management

Chapter 3 - Methodology

This chapter discusses research methodologies that could be applied to the research being undertaken. The methodologies are investigated in order to deduce which offers the best approach to the research, taking into account both the advantages and disadvantages of the potential approaches.

Chapter 4 - The need for a systematic approach to KM tool selection

This chapter fulfils objective two by discovering if there is need for a methodology to select a knowledge management tool. Nottinghamshire County Council was the organisation used to investigate how the business selected a knowledge management tool. Action research was carried out and helped to discover and give an understanding of the approach taken by the council. Interviews were also conducted

at the council that led to an understanding of the tools already present in the organisation and the issues with these tools. An analysis of the approach taken by the council was performed to discover if the approach led to the successful selection and implementation of a knowledge management tool or if a methodology was required that would improve the process of selecting knowledge management tools.

Chapter 5 - Knowledge management at AstraZeneca

AstraZeneca was the second organisation that was used as a case study in this thesis. Interviews were conducted at AstraZeneca to determine which knowledge management tools were being used in industry and how they are selected by an organisation. The knowledge management tools that were discovered during the interviews were evaluated to determine how successful they were and if there is a connection between how they are selected and introduced into an organisation and the success of the tool. This chapter fulfils the third objective listed.

Chapter 6 - Classification and selection of tools for quality knowledge management

The case studies from chapter four and five show that a systematic approach is required to selecting a knowledge management tool. This chapter proposes two tools that will aid a knowledge manager in selecting an appropriate knowledge management tool, given a knowledge problem. These tools can then be used to propose a systematic method of evaluating knowledge problems and knowledge management tools. The tools were developed with the focus on the tools being simple and easy to use by a knowledge manager in a working environment.

Chapter 7 - Analysis of the knowledge problem at Nottinghamshire County Council using the house

This chapter fulfils objective five by using one of the developed tools described in the previous chapter, the House of Knowledge Management Tool Selection, to analyse the knowledge problem at Nottinghamshire County Council and to discover areas of the tool that may require further development. The case study at the council,

which was described in chapter four, was analysed using the House of Knowledge Management Tool Selection which lead to clearer understanding of the underlying issues at the council. The house was used to evaluate the council's problem from three different perspectives demonstrating how the house could be applied to the scenario at the council and the different stages at which the house could be employed. The evaluation of the house highlighted an area of the tool that could be further developed.

Chapter 8 - The house of barriers

One of the conclusions from chapter seven suggested that further development of the house should identify ways of overcoming the barriers that had been identified. The house rates the barriers in terms of influence the barrier has on a tool and how easy it is to overcome the barrier for that particular tool in the first house. This chapter examines how a barrier could be overcome and the effect it may have on the original knowledge problem. This chapter fulfils part of objective five by further developing the house based on the case study work carried out on the knowledge problem at the council.

Chapter 9 – AstraZeneca and the grid

Objective five required the tools that had been developed in chapter six to be tested and further refined. Part of the toolset that had been developed included the Knowledge Management Tool Grid. This chapter investigates how the grid could be used in a working environment. The grid was used to analyse the knowledge management tools discovered at AstraZeneca and conclusions were drawn from the grid about the knowledge management strategy at AstraZeneca. This developed methods for using the grid further by showing that the grid could be used to evaluate knowledge management tools in an organisation.

Chapter 10 – Developing a framework and associated methodology

Having developed a toolset that could aid a manager in selecting an appropriate knowledge management tool, a framework and methodology are required to show

how and when each tool can be used. An overview of the toolset is described showing how the tools could be used together. Further workflow diagrams were created for each tool, as well as the different uses of each tool that have been discovered during the case studies. This meets objective six.

Chapter 11 - Conclusion

This chapter concludes the thesis by reviewing the aims and objectives and highlighting research limitations and further work. To meet objective seven an evaluation of the toolset was carried out by experts in industry.

Chapter 10

Developing a Framework and Associated Methodology

10.1 Introduction

Objective six from chapter one, suggested that a methodology was required to use the tools that have been developed in order to select an appropriate knowledge management tool given a specific knowledge problem. This chapter provides a framework for using the tools that have been discovered in order to make it clear how the tools can be utilised to select an appropriate knowledge management tool and when each tool can be used. The framework will take into account the potential different uses of the tools that have been discovered in the previous chapters and provide a flexible structure that a manager or user of the tools will be able to follow as required.

10.2 Framework vs Methodology

Research shows that that the difference between these two terms can sometimes be confusing (Mnkandla, 2009).

A framework is described by Mnkandla (2009) as providing a ‘skeletal abstraction of a solution’. The framework provides steps or phases that can be followed without going into detail of what activities are done at each stage. A framework is further defined as a:

‘broad overview, outline, or skeleton of interlinked items which supports a particular approach to a specific objective, and serves as a guide that can be modified as required by adding or deleting items.’ (Business Dictionary, 2012)

A methodology is defined as:

'A system of broad principles or rules from which specific methods or procedures may be derived to interpret or solve different problems within the scope of a particular discipline. Unlike an algorithm, a methodology is not a formula but a set of practices.' (Business Dictionary, 2012)

Or *'a system of practices, techniques, procedures and rules'* (PMBOK, 2008)

A methodology also gives details of what should be done at each phase of a process but not necessarily how they should be. (Mnkandla, 2009).

For the purpose of this thesis, a framework is defined as a collection of models, methods and tools, some, but not necessarily all, of which would be used to solve a particular problem. A methodology is associated with a framework and is a guide to which models, methods and tools from the framework should be used in any particular circumstance along with the order of use and particular ways to use the different part of the framework. The previous chapters in this thesis have described the different components of the framework and this chapter gives the methodology for the use of the framework to select appropriate tools for knowledge management.

10.3 Why is a Framework and Methodology Required

Chapters six, seven, eight and nine have investigated the house and the grid and have shown the various ways in which these two tools can be used. Both the house and grid have been developed and used in different ways and under different circumstances and creating a framework will give the user of the toolset a clear view of how the tools can be used.

The methodology for using the framework that has been developed shows how the tools can be used together creating a clear diagrammatical view of the toolset. This methodology illustrates the different stages in the process of selecting a knowledge management tool and when and how each of the tools that have been developed can be used to aid the manager in selecting a knowledge management tool. The methodology and framework developed will take into account the various ways in

which the tools have been used, such as the use of the grid to both evaluate the knowledge management tools within an organisation and to help select potential tools to be included in the house for further analysis.

10.4 Overview of the Toolset Discovered

Two basic tools were discovered in chapter six and both of them showed their versatility by being used in different ways in subsequent chapters. The house was first used to find an appropriate tool given a knowledge problem and later developed into the Barrier House that analysed the issue of the barriers. The grid was also used in two ways; the first, to discover potential knowledge management tools that could be used in the house, and the second, to use the grid as an evaluation tool, evaluating knowledge management tools already used in an organisation.

The framework developed centres around using the original house (HoKMTS). This is the main process with the focus being on how to select an appropriate knowledge management tool given a knowledge problem. Figure 10.1 illustrates the process for completing the house on the left hand side. The development of the house in chapter six shows that the first step to populating the house is to identify the knowledge problem that needs addressing. The next step is to populate the tool and technique area followed by populating the relationship and total area. The barrier basement is then completed before selecting a knowledge management tool. Due to flexible nature of the house it is possible to add or remove knowledge problems, tools or barriers at any stage of completing the house but following the methodology would ensure that all areas of the house are populated methodically and sections are not missed out.

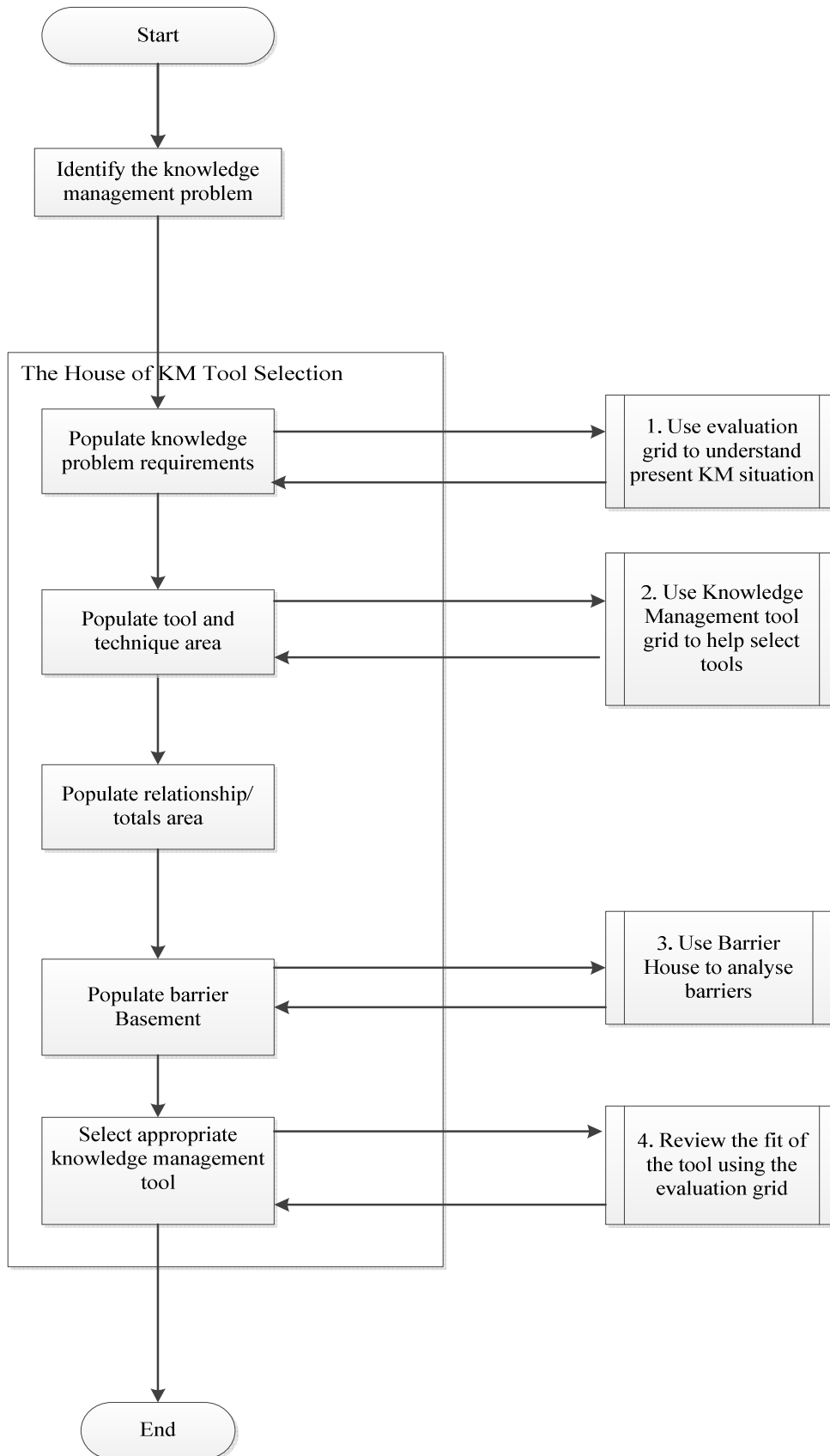


Figure 10.1: overview of the toolset

The right hand side of figure 10.1 illustrates where the other tools can be used to help complete the house. There are four sub processes (numbered 1-4) on the right hand side each one demonstrating how another tool can be used at that point to help complete the main house.

- Sub process 1: This illustrates where the grid can be used as a method of evaluating the present situation in the organisation. The grid was used to analyse the tools at AstraZeneca showing which areas of knowledge management were being addressed. The grid can be used to highlight areas of potential knowledge problems and illustrate if tools already exist in the organisation to address these problems. The results of the grid can then be used to feed back into the house to help populate the knowledge problem requirement area.
- Sub process 2: This sub process again uses the grid. This time, however, the grid is used to help select tools that could be used to populate the tool and technique area of the house. This was the original use of the grid which was investigated in chapter six.
- Sub process 3: the tool used here is the Barrier House. The Barrier house analyses the barriers in greater detail and the results can help populate the main house.
- Sub process 4: The grid can be utilised here to help evaluate the fit of the tool that has been selected. The grid created in sub process 1 can be reused at this point by adding the new tool to analyse the new tool or the new functionality of the tool in terms of which knowledge problem it is expected to address. The grid could then be referred to at a later date to check if the tools are producing the expected results.

Figure 10.1 has given a simple overview of how and when the tools can be used together. Figure 10.2 helps the user to determine how and why each of the tools would be used to help populate the house. Comparing the two figures shows that figure 10.2 is similar to the figure 10.1 with the addition of questions that allow the user to ascertain whether they need to use the extra tool or not.

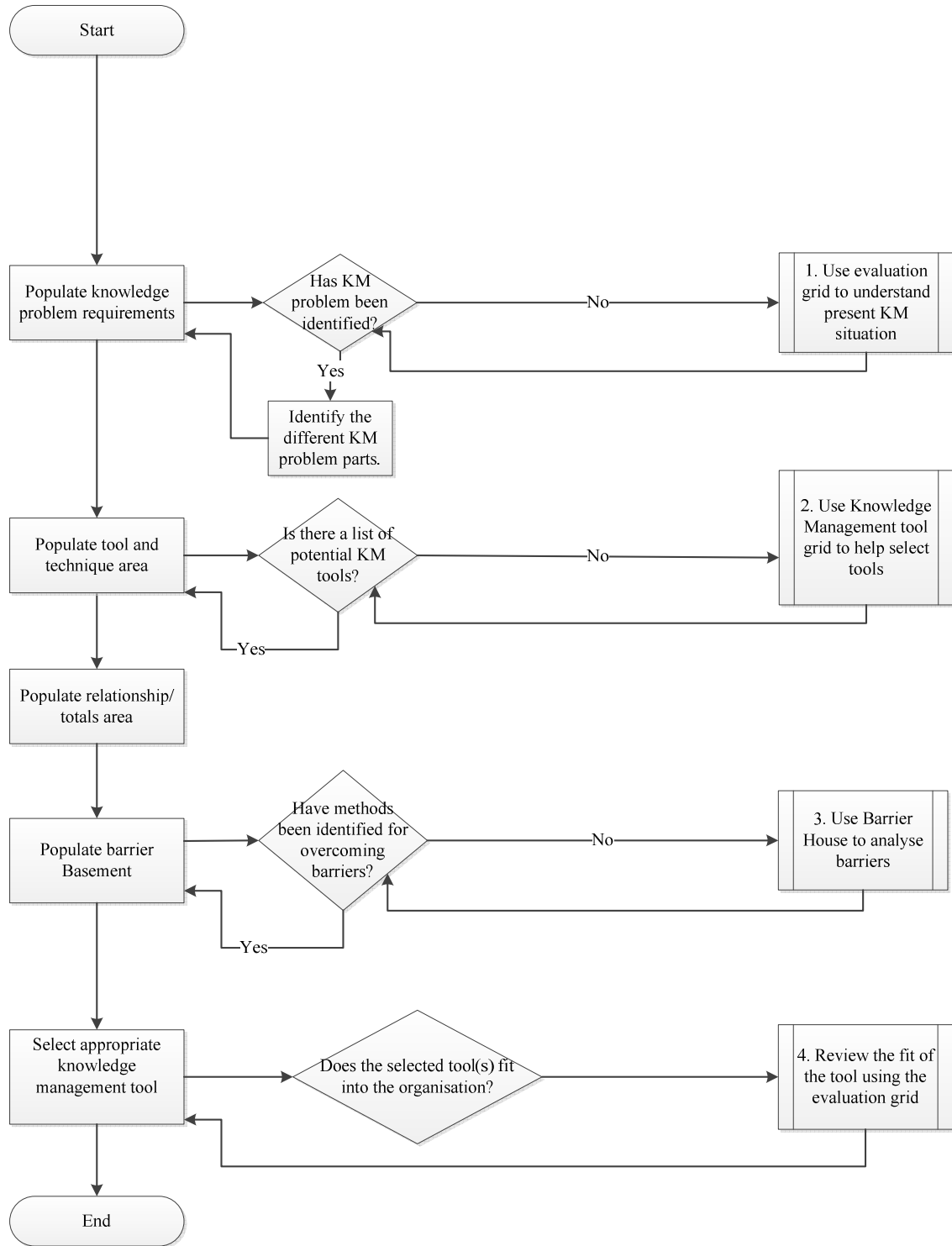


Figure 10.2: The reasons for using the sub processes.

Figure 10.2 shows that, in order to decide whether to use the grid to understand the KM problem, the user of the house needs to decide if the KM problem has been identified. If it has not then the grid can be used to understand the present situation with regards to the KM tools in the organisation as indicated by the process figure. If the KM problem has been identified, then the next step of the process is to identify the different KM problem parts and then populate the knowledge problem requirement area of the house. If the evaluation grid is used to evaluate the present KM situation the work flow figure shows that the question is asked again to check that this step has been achieved before moving on to the next step.

To decide whether the second sub process is required the user of the house needs to know if there is a list of potential KM tools or not. If there is, then they can be used to populate the tools and techniques area of the house. If not, then the grid can be used to help select tools and techniques to use in the house.

The third sub process involves using the Barrier House to further analyse the barriers. The main reason for using the Barrier House was to investigate ways of overcoming the barriers that had been discovered and the effect of overcoming the barriers on the original knowledge problem. Following the workflow of figure 10.2 it can be seen that the question is asked as to whether methods for overcoming the barriers have been identified. If methods have been found, then the arrows feedback into the HoKMTS and the barrier area of the house can be populated. If methods have not been identified, then the sub process of using the Barrier House can be used in order to identify the methods and lead to a better understanding of the barriers. Having used the Barrier House and followed the sub process the arrows suggest asking the question again in order to clarify that this step has been completed before moving on and following the next step of the process.

Sub process four reviews the fit of the selected tool. The question to determine if this sub process is required is whether the selected tool is either new or offers new functionality. If the answer is yes, the fit of the tool can be reviewed using the evaluation grid that was developed in the first sub process. Having used the evaluation grid, if the tool is shown to fit the organisation then the process ends,

however, if the tool does not fit then another tool should be selected and the process to review the fit should be repeated.

10.4.1 Toolset Overview Conclusion

Figure 10.1 offers an easy and clear view of how the whole toolset can be used to help select a knowledge management tool and how the tools interact with each other. Figure 10.2 is a more detailed version of figure 10.1 with further guidelines of the circumstances in which the grids and the barrier house could be used. This is achieved by asking questions to guide the user into deciding if using the other tools will help populate the House of Knowledge Tool Selection (HoKMTS). The answers to the questions determine whether each sub process needs to be followed. It is possible to complete the HoKMTS without using any extra tools, but it is also possible to use all of the tools. This shows that the suggested framework is a simple flexible structure that can be used as required.

10.5 The Sub Processes

The following figures investigate the four sub processes that were suggested in section 10.4. They have been produced separately from the main figure to make them easier to follow.

10.5.1 Sub Process 1

This process figure uses the evaluation grid to understand the present KM situation. The knowledge problem that is being addressed by HoKMTS should be known but the grid will help to evaluate the tools that are already being used by the organisation and what knowledge problems are being addressed by these tools. If the KM problem being investigated is the same as the problem areas being covered by the tools already used, it would suggest that the tools are not working or that there are other issues within the organisation. It would be pointless investing in another tool without resolving these issues. Using the grid as an evaluation tool can help highlight this.

Having decided to use the grid to evaluate the knowledge management tools being used by the organisation, the first step for using the sub process is to identify the KM tools that are already being used in the organisation (Figure 10.3). If the tools have not been identified, then a brainstorming session is suggested to help identify them. Once the tools have been identified, the next step shows that an understanding is required of how they are being used in the organisation. The case study at AstraZeneca showed that tools are not necessarily being used as expected and, therefore, the figure suggests that interviews or questionnaires could be used to understand what knowledge management problem the tools are actually being used to address. Having discovered what problems the tools are addressing, the grid can be populated and potential problem areas identified. The results of the grid can then be fed back into the HoKMTS. This will either confirm that the original problem the HoKMTS is being used to investigate is a problem and no tools already exist to solve it or that tools are being used but the problem still remains.

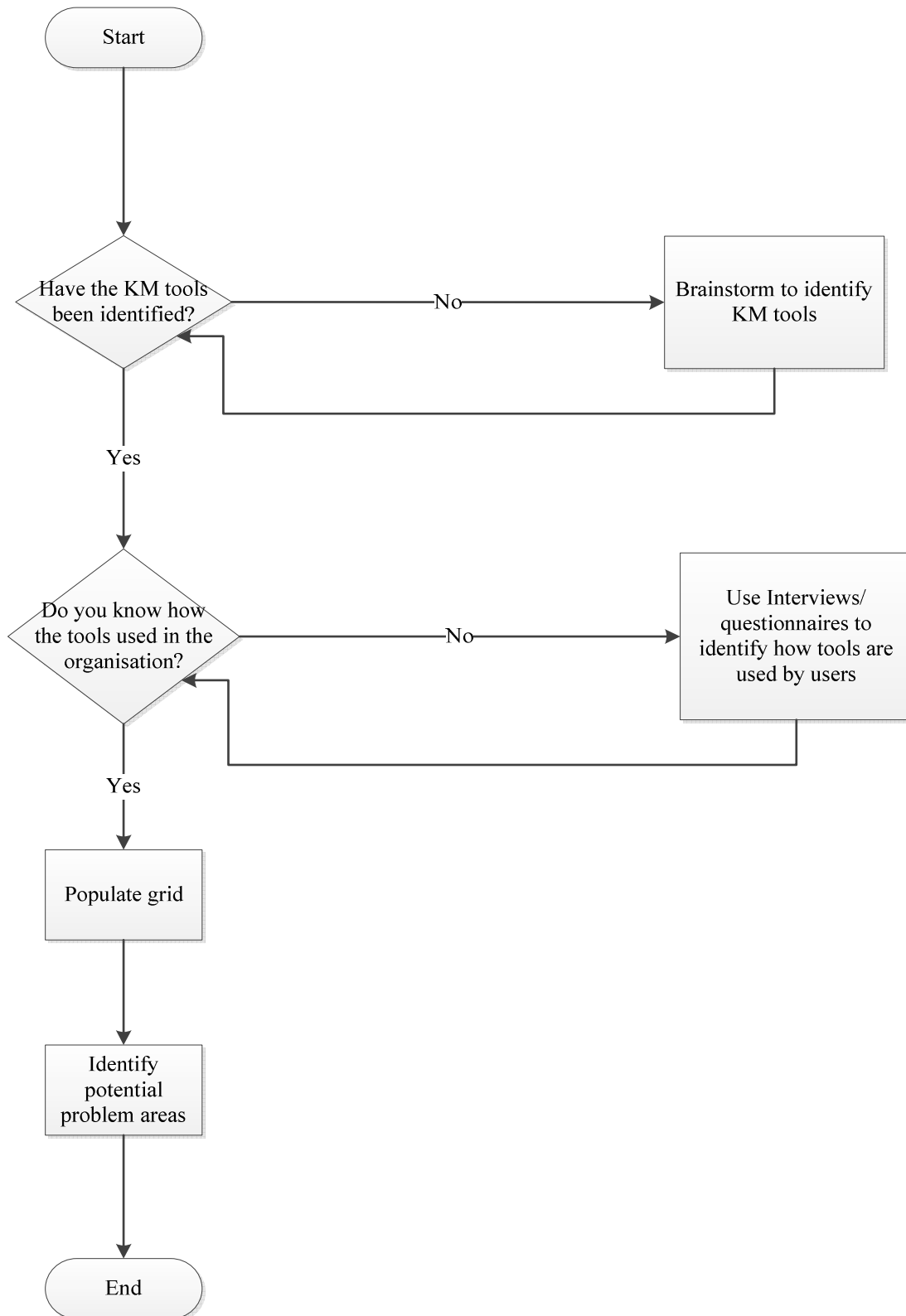


Figure 10.3: Evaluating the present situation

10.5.2 Sub Process 2

This sub process (figure 10.4) uses the grid again, this time to help identify potential tools for inclusion in the HoKMTS. This grid is based on the theoretical use of the tools as opposed to the actual use of a tool. This differs from the evaluation grid used in the sub process 1 in that it is completed, based on what the tool is actually being used for by the organisation.

The process starts by identifying a list of tools for inclusion in the grid. Potentially a list could already exist, if not, the grid completed in chapter six could be used to help identify tools. Brainstorming sessions could also be used to enable a group of people to complete the grid. The list of tools used could be mixture of tools already being used by the organisation, tools that the organisation feel would solve the knowledge problems that are being addressed as well as tools that are not expected to be very suitable but are included to confirm this is the case.

Following the process in figure 10.4, having identified the tools, the knowledge problem each tool address needs to be identified and then, whether it is the main purpose, an added bonus or not guaranteed outcome of the tool. The grid contains ten knowledge problem areas ranging from validation to storage and by completing the grid a better understanding of the potential use of each tool is achieved. The tools are then placed in the grid accordingly. From the resulting grid, tools are then selected for inclusion in the HoKMTS. The tools selected will be based on the match of the knowledge management problems the tools address, according to the grid, with the knowledge problem requirements the house is being used to solve. The selected tools may not deal with all the problem requirements of the house and some of the problem requirements in the house may not be in the grid, but tools should still be selected, even if they only focus on certain aspects of the problem. The house did show that a combination of tools may offer a better solution to the knowledge problem.

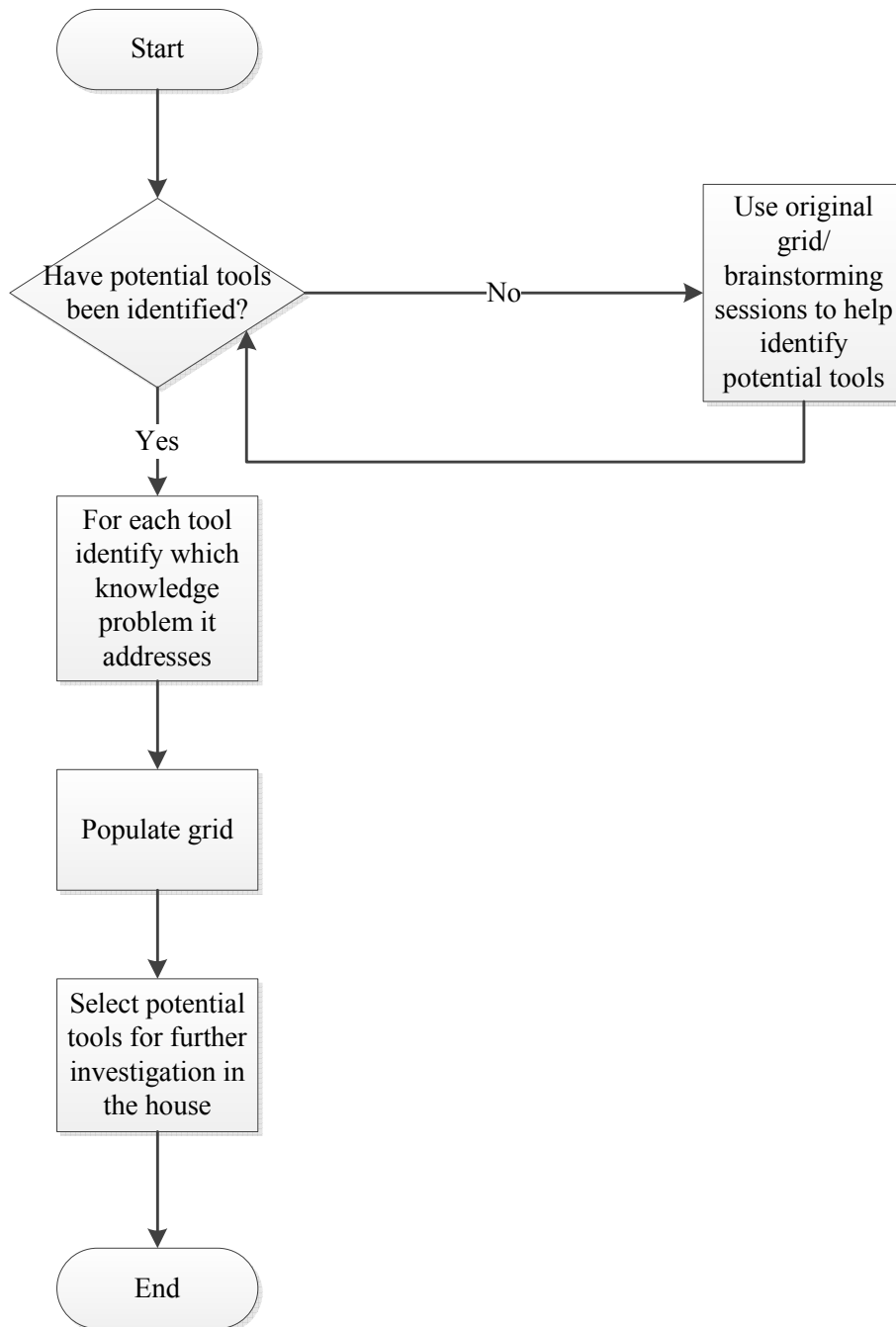


Figure 10.4: Selecting potential tool for the house

10.5.3 Sub Process 3

Sub process 3 involves using the Barrier House to further examine the barriers that have been identified. Chapter eight discovered that further investigation into how the barriers could be overcome was required as the tools used to overcome the barriers could adversely affect the knowledge problem being investigated.

The process commences, in figure 10.5, by populating the barrier section of the house with the barriers discovered in the HoKMTS. The barriers are then rated according to the influence ratings that have already been assigned to them in the original house. From figure 10.5, the next step is to identify methods of overcoming the barriers and then to populate this area of the house. Brainstorming again could be used as a method for discovering ways of overcoming barriers. The techniques selected to overcome barriers may only help with one or two barriers or several of them but all of them can be included in the Barrier House. Having populated the tool area the tools are then rated against the barriers to determine how effective they are at overcoming the barriers. The original problem requirements can then be placed in the bottom section of the house and the tools rated against them to show if the tools affect the original problem requirements.

Figure 10.5 shows that at this point the results from the Barrier House can either be used to complete the overcome ratings in the barrier basement area of the HoKMTS or that the findings from the Barrier House can be compared to the ratings already assigned to the barriers in the HoKMTS to see if they can be altered to reflect the new findings discovered in the Barrier House. Having done this the process ends.

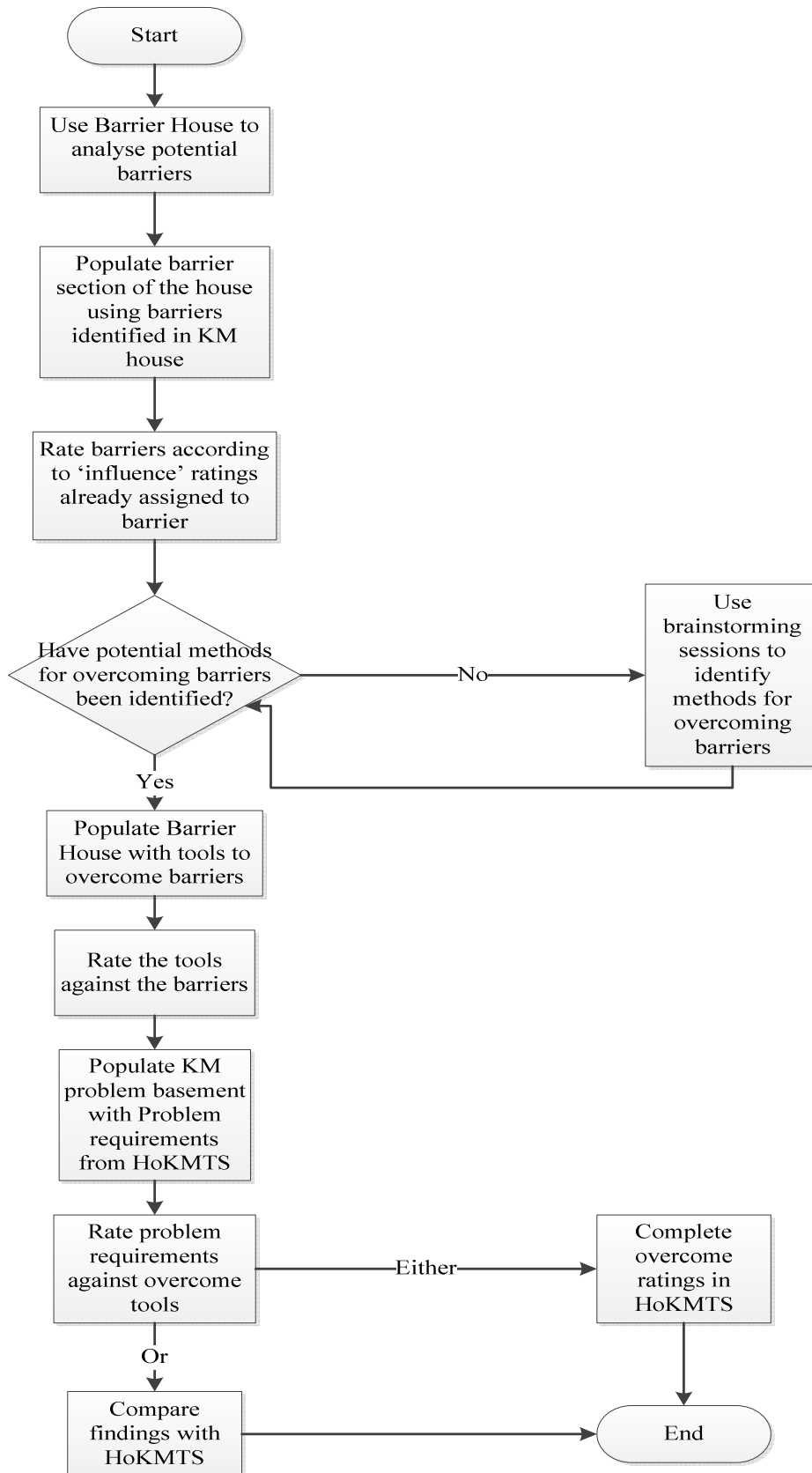


Figure 10.5: Process for the barrier house

10.5.4 Sub Process 4

The final sub process is shown in figure 10.6. This process involves using the evaluation grid that was used in the first sub process to review the fit in the organisation of the new tool that has been selected.

The methodology shows that the first step is to add the tool to the evaluation grid according to which knowledge problems it is expected to help with. The process then asks if the tool addresses the appropriate knowledge problems that required solving. If the answer is no, then another tool should be selected which requires going back to the house and selecting a more appropriate tool. If the answer is yes and the selected tool does fill in the appropriate knowledge management areas of the grid, then the tool is examined to see if it fits the knowledge management strategy of the organisation. The process figure 10.6 shows that, if it does, then the process finishes, and if not, another tool needs to be selected. If the tool that was selected only satisfied some of the knowledge problem areas a second may need selecting to address the remaining problem areas as opposed to trying to find a new tool to satisfy all the problems. This would lead to the introduction of two or more tools to address the knowledge problem.

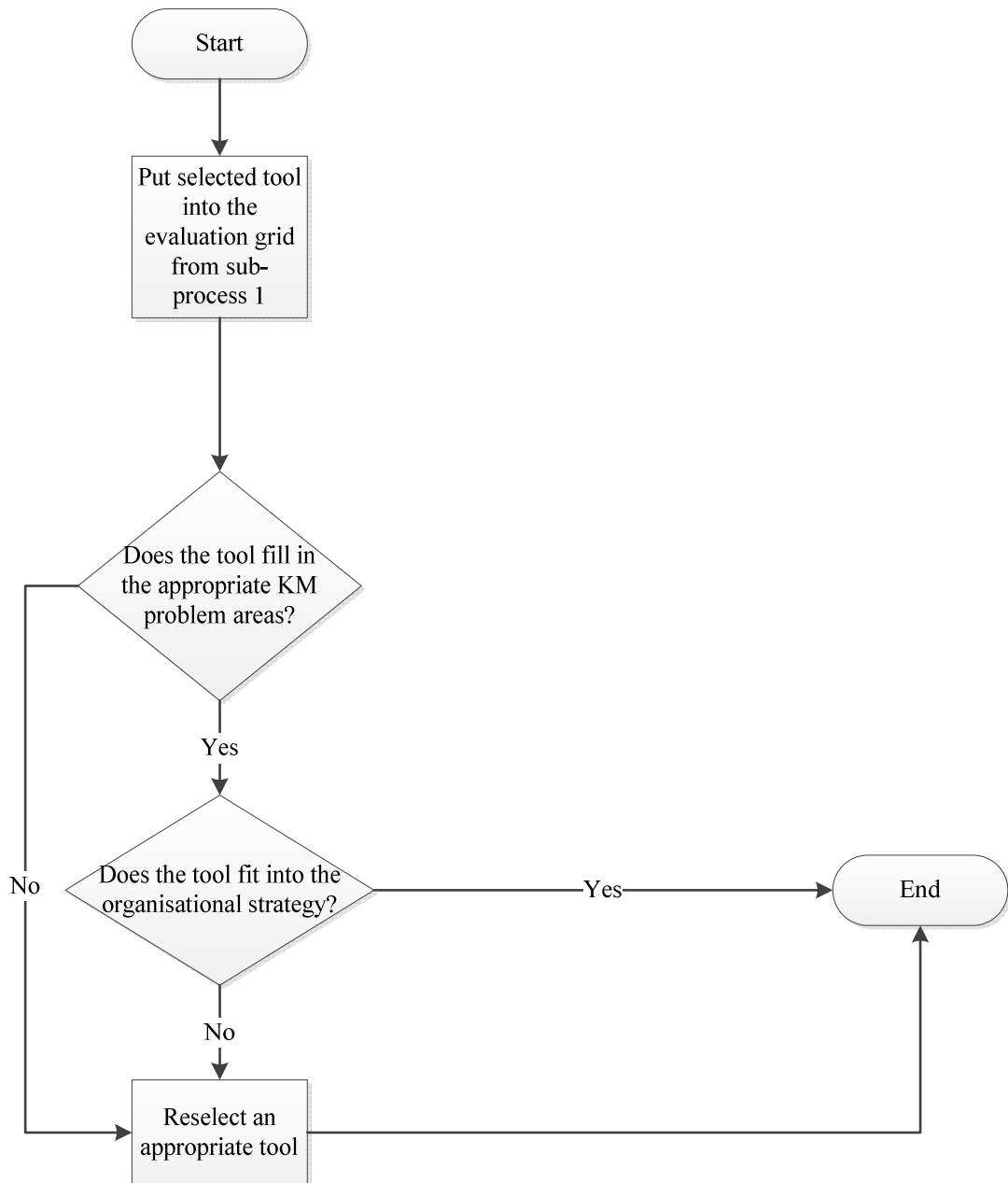


Figure 10.6: Reviewing the fit

10.5.5 Sub Process Conclusion

The process figures provide a clear step by step guide to completing each of the sub processes ensuring that all areas of the grid or house are populated. Although the grid is used in three of the four sub processes, the figures show that the questions asked and results obtained from the grid differ in each case.

Providing separate figures for the sub processes has two main benefits:

1. It keeps the main overview of the house simpler and easier to follow
2. It acknowledges that the sub processes do not necessarily need to be used and that they can also be used independently of the house, as shown by using the evaluation grid for AstraZeneca in chapter nine.

The methodologies for completing the four sub processes have offered a systematic way of approaching each of the sub processes making their use more simple and efficient, and this ensures all the necessary steps are undertaken to give an effective solution.

10.6 Who Populates the House

In an organisational environment, if the house is being used as part of a project to introduce knowledge management tools, the whole project team could be involved in populating areas of the house. Although the house could be completed by a single person, during the research it was found one of the most effective ways to populate areas of the house or grid was to use more than one person in brainstorming sessions. This was especially true of the ratings areas of the house due to different users' perspectives on the ratings and their different understanding of the tools. In an organisation, the project could use meetings and brainstorming sessions to complete the house.

To facilitate brainstorming session, an expert in the house could be used or training could be provided but this may not be necessary as the house methodology and framework are relatively easy to follow. As the house is a flexible tool, users can adjust the toolset discovered to fit their own requirements.

10.7 Conclusion

The framework that has been developed shows how the toolset can be used to select an appropriate knowledge management tool. The framework is a loose flexible structure and shows the potential ways the tools can be used but not necessarily the

only way. It is possible to only use certain aspects of the framework to select a knowledge management tool depending on the working environment of the organisation, for example the evaluation grid may not be needed in a particular company environment. The grids could also be used on their own to evaluate the current position of knowledge management in an organisation or give a better understanding of knowledge management tools. The framework is, therefore, a guide with the figures giving a clear methodical view of when and how the toolset can be used.

CHAPTER 11

CONCLUSION

11.1 Introduction

This is the concluding chapter of the thesis. The evaluation of the toolset by experts in the field of knowledge management is examined. A review of the aim and objectives set in chapter one is carried out to show how they have been met. Research limitations, contributions and further work are also considered.

11.2 Evaluation of Toolset

Objective seven from chapter one required that the potential effectiveness of the toolset was evaluated in real working environments. Several ways of evaluating the toolset were considered. Finding another case study was considered, one that was suitable to apply the tools to and then be able to compare the results found by the tools to those found during the case study. Another method of evaluation was to find a real life project on which the tools could be used. Both of these were discounted due to the lack of time and the issues already encountered with finding and accessing this type of knowledge problem.

The third way considered of evaluating the tools was to involve experts in the field of knowledge management and to ask them to review the tools. It was this approach that was taken, especially given the time constraints involved.

11.2.1 Evaluation by Experts

In order to evaluate the tools, experts in industry were contacted to see if they would be willing to read the material sent to them, evaluate the tools and provide feedback on the tools (Appendix E). The experts were selected as they had contacts with Loughborough University and they worked within the knowledge management industry. Four experts were contacted and agreed to read the material sent to them.

The four experts worked at Airbus, Rolls Royce in Germany, Rolls Royce in the UK and a consultancy firm in London. The chapters that were sent to the experts were:

Chapter 6: Classification and Selection of tools for Quality knowledge Management

Chapter 7: Analysis of the Knowledge Problem at Nottinghamshire County Council using the House

Chapter 8: The House of Barriers

An introductory chapter was also sent to help give a brief background to the research and outline the research that was carried out at Nottinghamshire County Council. In total the material sent to the experts comprised of eighty seven pages.

Of the four experts contacted only two provided feedback on the tools due to time and work issues experienced by the experts.

- Feedback from first expert

The first expert was Dr J Thomas, Chief of Quality and Continuous Improvement-engineering, Rolls Royce Deutschland (Appendix F).

Dr Thomas suggested that the House of Knowledge Management Tool Selection and Classification Grid were effective and practical tools that would aid a manager in the selection of knowledge management tools. The house offered an all-inclusive approach to selecting knowledge management tools in that it considered many aspects that affected selecting a tool including the knowledge problem, potential barriers, people and IT. This was seen as a unique characteristic of the house. Dr Thomas believed that the tool could be used on several occasions in the business environment, and indeed stated that she could use the tools herself.

- Feedback from the second expert

The second expert was Dr P Balafas, director of Balowen Consulting in London (Appendix G).

Dr Balafas provided a longer review of the material sent. His comments can be seen in Appendix G. Dr Balafas was generally positive towards the tools, describing them as ‘...very good tools, the outputs are clearly useful ...’, however he did make some useful comments regarding the way the tools were presented in the documentation provided to him, and the lack of guidance for using the tools. In total Dr Balafas raised eight main points that are discussed in turn below:

1. *I recommend including a definition of "knowledge" vs. "information" for the purpose of this thesis*

The definition of ‘knowledge’ vs ‘information’ was defined in chapter two, section 2.2.1. This chapter was part of the literature review which was not sent to the experts for evaluation.

2. *As a general rule, if managers are to use these tools, some of them would need to be simplified. For example, a manager is more likely to prefer Figure 8.3 (main body of Barrier House) or Table 1 (KM Tool Grid) or Table 7.1 (Problem requirements) in comparison to some of the more complex diagrams/tables.*

Simplifying the application of the tools has been approached in two ways. The first was to introduce a framework and methodology to assist the users of the tools. This was covered in Chapter 10 of the thesis. The framework and methodology were not reviewed by Dr Balafas but were developed to address the issue of the difficulty he raised of knowing when and how to use the tools. The methodology can be used as a guide to using the tools and should make it simpler to use the toolset, allowing users to have a clearer understanding of when and how the house and grid could be used.

The second way of simplifying how the tools are used would be to further develop the toolset as an online version of the house. This is discussed further in section 11.5.

3. *Based on experience, a more simplified model, e.g. a Pyramid instead of a House would be easier for a manager to follow. However, if it is too late to make that change then I would recommend re-thinking where each of the categories in the House are placed, so that there is a logical flow. At the moment, it is not clear why each category is where it is (for example, why are Problem Requirements defined in the left wing, outside the House?). The only model that did seem to have categories placed in a logical flow was the House of Barriers (figure 8.1), starting from the bottom and moving up (like a Pyramid).*

As the review of the tools took place towards the end of the research redeveloping the tools into different models was not possible. The house was based on the House of Quality Matrix and the positioning of the areas in the house was based on the original positions of the similar areas in the House of Quality. The diagrams and explanations of these areas were covered in chapter 6 in sections 6.2 and 6.3. The Problem Requirement area was positioned on the left hand side of the house as it reflected the position of the customer requirement area in the House of Quality. The tools and techniques are at the top of the house which is where the techniques are placed in the House of Quality. The main body of the both houses show the results. The main difference between the two houses is the placement of the barrier area at bottom of the house. The basement seemed an appropriate place to position the barriers, hidden out of the way. Keeping similar elements of both houses in similar positions was done so that anyone using the HoKMTS and who was familiar with the House of Quality matrix would find the house easier to use.

4. *HoKMTS is a mouthful and difficult to remember. I'd recommend a shorter name.*

A shorter and easier name for the house was acknowledged as an issue during the research and investigated but a more appropriate name was not found.

5. *In each Chapter, when explaining how each model has been filled out, I'd recommend either placing the diagram at the beginning of the chapter or at least referring the reader to it. Otherwise you risk the reader trying to read through all the explanations before actually seeing the diagram and losing track (happened to me).*

The placement of the diagrams was checked to see if they were in the most appropriate position to ensure the reader did not get confused. Some diagrams and tables were repositioned.

6. *In general, I would say that managers would find the Outputs of the Tools very useful, because it is possible in a quick glance to see Where the major problem areas are, What the most appropriate tools to use are and What the likely barriers are, etc. However, I think managers would find it difficult/time consuming to actually Apply the tools themselves, i.e. they would need someone like you that is a specialist. This is an inherent barrier. So it either needs to be recognised openly as a disadvantage of the model (there is no perfect model) or the method needs to be simplified. This is a classic trade off: Simplicity of Use vs. Accuracy of Results*

The question of who would use the tools was discussed in chapter ten (section 10.6). This chapter was not sent to be evaluated. It was suggested that a team of people or an individual could populate the tools and that an expert could be brought in. The expert could provide a more in depth use of the toolset as they would be more familiar with the tools and their uses.

One of the recognised issues of the 'House of Quality Matrix', which the House of Knowledge Management Tool Selection is based on, was the complexity associated with populating it and the issues with the length of time it could take to populate it. This was addressed when developing the house by simplifying the way the ratings were determined. The House of Quality Matrix uses a weighting system rather than the simpler scale system used for the HoKMTS. The House of Quality matrix uses questionnaires and feedback from customers to help populate it which can be very time consuming. The suggested use of the HoKMTS is to avoid this delay by, instead, using brainstorming sessions.

Dr Balafas in his feedback suggested that there is a need for a 'classic trade-off' between 'simplicity of use' and 'accuracy of results' which has been approached to a certain extent when developing the HoKMTS when compared to the House of Quality Matrix. Potentially the house could be made even simpler to use by developing it further as an online tool.

7. *The benefits house analysis and alternative tools house analysis are interesting, especially when it is possible to see the mismatch between benefits and solutions to problems that are not the same at the original problems. This is usually a very strong indicator that the organisation is not focusing or analysing the "what problem are we trying to solve" and "what existing capabilities/tools can we use to solve them" questions, and your tools are good at pointing that out and refocusing.*

The feedback shows that the toolset can be used to analyse a knowledge problem such as the one at the council and provide useful results.

8. *Overall very good tools, the Outputs are clearly useful, if you can simplify the Application of the tools then I can see these being used by managers when selecting KM tools.*

The framework and methodologies were developed in order to clarify how and when the tools can be used making it easier to populate the houses and grids. The potential

to further development of the tools by creating a web tool would also make it easier for the user. However, overall, Balafas suggests that the tools are useful when selecting KM tools.

11.2.2 Conclusion of Expert Evaluation

The evaluation by the experts show that overall the tools were found to very useful with the potential to be used in the working environment. The framework and methodology have been developed to help address the issues raised by the experts over the complexity of using the toolset.

11.2.3 Overall Conclusion of Evaluation

The evaluation of the toolset was limited by the time constraints imposed. The tools needed to be developed, tested and further developed before a final evaluation of them could be undertaken. This resulted in not being able to evaluate the tools until towards the end of the research period leading to a very limited timescale in which to evaluate the tools and consequently only a limited evaluation of the tools took place.

Using experts to evaluate the toolset, although useful and provided feedback on the tools, also highlighted some of the limitations of using this approach. The four experts selected also have full time busy jobs in industry giving them limited time to be able to read through the material sent. The chapters sent amounted to eighty seven pages which is time consuming to read and evaluate. Consequently only two of the experts managed to evaluate the material sent. The framework and methodologies were developed towards the end of the research period making it impossible for them to be evaluated within the time given to do the research.

In hindsight, it may have been possible to evaluate certain aspects of the tools as the research progressed, such as finding people who could attempt to populate the house for a given scenario. This could have discovered the issues that might be encountered with assigning the ratings required as well as how long it took for users to populate the house.

11.3 Review of the Aim and Objectives

Seven objectives were set in chapter one. The following is a review of the objectives that were set and how they were satisfied.

1. Carry out a literature review to determine:

a. how organisations are approaching knowledge management

It was concluded that the literature showed that organisations see knowledge management as a key feature in order for the business to remain competitive. Organisations recognise the importance of knowledge management but are struggling with finding an approach that results a successful outcome.

b. what tools and techniques are associated with knowledge management

The literature suggests that knowledge management tools and techniques are not necessarily IT based but that non IT tools are used as well. Most of the research, however, focuses on IT tools, even though it is suggested that IT should be treated as an ‘enabler’ to achieving knowledge management. It was noted that, with the advent of new technology, new knowledge management tools were being discovered such as social networking tools that are now being used by businesses.

No clear list of knowledge management tools was discovered and no way of evaluating tools effectively in a working environment was found in the literature. The literature shows that the classification of tools has been approached in several ways. However, none of the methods for listing or classifying knowledge management tools appeared to be helpful to a manager when trying to select a tool.

c. how these tools are currently selected

It can be concluded that the literature shows that there is a definite need for businesses to be able to select knowledge management tools. Organisations are having difficulties in selecting appropriate knowledge management tools. It is suggested that, when selecting tools, certain criteria need to be considered, including the business goals and organisation strategy, but that no clear or systematic methodology is reported in the literature for doing so.

d. what methodologies exist for selecting these tools

There is limited research showing methodologies for selecting knowledge management tools. Those that do exist, such as the Analytic Hierarchy Process (Ngai and Chan 2005), were found to not cater for all tool types and were not flexible. It was suggested that further research was required in this area.

e. how successful these tools and techniques are at delivering the expected outcomes

It was suggested that knowledge management implementations are not proving to be as successful as expected (Dawson, 2007). This also applies to the tools and techniques that are being used. Researching the literature found that organisations tended not to broadcast any tools or projects that failed, which makes it difficult to ascertain exactly how successful knowledge management initiatives are overall. Most organisations tend to provide success stories rather than the failures.

f. what barriers to successful implementation of knowledge management have been found

Several barriers to successful implementation of knowledge management tools were discovered in the literature. These included:

- The cost of KM projects
- Organisational technical ability
- Organisational culture
- A lack of knowledge structure
- A clear purpose of KM projects
- Users need encouragement to use the tools
- A lack of senior management support
- A lack of users' time

Other barriers discovered relating to specific tools are:

- Tools are not being used long term
- A lack of core groups using the tools
- A lack of understanding of the tools by the users

- Tools not being part of the day to day business
- Users need motivation to participate and use the tools

g. what gaps exist in the literature that could be further examined

The literature review showed that there were several gaps that required further research. These are:

- A clear classification or list of knowledge management tools that would aid managers when selecting a tool is required.
- A methodology is required to aid managers in selecting and evaluating knowledge management tools.
- A method of evaluating the barriers to the tools is required.
- An understanding of how barriers can be overcome is needed.
- A flexible approach to selecting knowledge management tools is required to cover IT and non IT solutions as well as new emerging technology.
- A better understanding is needed of how successful knowledge management tools are in industry.

From the above, it can be concluded that the literature review carried out in chapter two has successfully met the objectives that were set.

2. To discover if there is a need for a methodology to select knowledge management tools

Action research carried out at Nottinghamshire County Council discovered that they had no clear, systematic method for selecting an appropriate knowledge management tool. The involvement with the council found there were no clear processes to follow to select a tool which led to a haphazard approach. In the case of the council, they decided on a tool and then created the problem to fit the tool. There was no analysis done of the tools that were already being used at the council to discover why they were performing as required

The literature review carried out in chapter two suggested that a clear systematic method for selecting knowledge management tools was required. Chapter four

investigated the situation in industry and also concluded that this was required, thus satisfying objective two.

3. Determine current methods and best practice in use in the selected companies today.

This objective was divided into several smaller points, which were addressed by chapters four and five, the action research at the council and the interviews at AstraZeneca.

a. How are tools selected for use in organisations?

The case study at the council showed that there was no clear process to selecting tools. The council decided to use SharePoint based on the strong marketing skills of Microsoft. AstraZeneca did introduce some of their tools based on the ability of the tool to solve a problem, but no systematic or defined process for selecting the tools was used at either organisation.

b. How are tools being introduced into organisations?

The interviews at AstraZeneca revealed that tools were introduced in a one of two ways. Some tools were introduced by management in a top down approach to solve a specific problem. Other tools entered bottom up, with users finding them useful and persuading others to use them. The users of the tools felt that knowledge management tools tended to appear silently and with little or no promotion and no training.

c. Which tools are successful and which tools fail?

The research showed that, at AstraZeneca, no tool was thought of as being successful. The interviewees described the tools as useful. Once the tools were live, no analysis of the tools usage was undertaken at either organisation making it difficult to declare if a tool was successful or not. At AstraZeneca, only one tool was described as having failed due to the lack of promotion.

At the council, the present electronic document systems were seen as not yielding the required results, necessitating the introduction of SharePoint. However, very little analysis of the issues was undertaken.

d. Are tools being managed or are they left to run themselves?

The interviews at AstraZeneca confirmed that tools were left to their own devices once they had gone live.

e. Is there a need to be able to systematically evaluate tools and techniques?

It was discovered, during the case studies, that both organisations would benefit from a systematic way of evaluating knowledge management tools. The council needed to evaluate the tools they already had to better understand the problems associated with using them. When AstraZeneca were searching for new tools to introduce, they did not evaluate all potential tools, resulting in only a limited choice of tools.

f. Is there is a systematic way of evaluating knowledge management tools already being used?

The two organisations neither used a systematic way to select and introduce knowledge management tools into the work place nor did either evaluate the tools they already had.

4. Develop a tool or selection of tools to aid a knowledge manager to identify knowledge management tools to be used in the manager's own environment.

Chapter six developed two tools to aid a manager to select an appropriate knowledge management tool. The House of Knowledge Management Tool Selection is a simple graphical tool that was developed to show all the areas that need to be considered when selecting a knowledge tool. It allows several tools or techniques to be evaluated against the knowledge problem to be solved and takes into consideration the issues and barriers that could affect the success of a tool.

The second tool that was developed was the knowledge management problem tool classification grid. This grid was used to analyse the potential tools against knowledge problems in order to decide which tools would be suitable for inclusion in the house. The grid allows the user to have a better understanding of the nature and use of knowledge management tools.

5. Test the toolset developed in Objective 4 to further develop and refine the tools.

Further case studies were carried out using both the council and AstraZeneca. The tools that were discovered during the interviews at AstraZeneca were used to populate the grid that had been developed in chapter six. The grid was used slightly differently this time in that it was used to evaluate the tools from AstraZeneca. This further developed the use of the grid as an evaluation tool that could be used by organisations to analyse the tools that they employ by investigating which knowledge problems they address. The results from the grid can be compared to the knowledge strategy of an organisation showing if the tools compliment the strategy and the results can highlight if the tools are being used effectively by the organisation. Chapter nine, therefore, further developed the use that could be made of the grid.

Chapters seven and eight further refined the purpose of the house of Knowledge Tool Selection. This was achieved by using the Nottinghamshire County Council as the case study for these two chapters. Chapter seven investigated the different ways in which the house could be employed to analyse the various issues that the case study at the council had shown. This developed the different ways the house could be used from analysing the tools already used by the council to solve their document problem to more, in-depth analysis of the knowledge problems that existed at the council. Chapter eight established another use of the house by developing the house to analyse the barriers and issues in more depth and investigating ways to overcome the barriers.

Chapter seven, eight and nine therefore meet the fifth objective that was set.

6. Define a framework and an associated methodology for the use of the toolset developed in objectives 4 and 5

A framework and methodology for the toolset was created in chapter ten. The framework provides a flexible guide to how and when each part of the toolset can be utilised by a manager in order to select an appropriate tool. The framework and methodologies show that the toolset can be used together, incorporating the various ways that they can be applied to a knowledge problem and to knowledge management tools. The methodology provides the user with a step by step guide to

each tool which allows each tool to be used either individually, such as using the evaluation grid on its own, or as part of a process using the whole toolset.

7. Evaluate the potential effectiveness of the tools in real working environments.

This was achieved in this chapter, section 11.2. Experts in industry were asked to evaluate chapters of the thesis containing the tools and the case studies. The experts concluded that the tools could be effectively used in a working environment to analyse potential tools and knowledge problems as well as helping to select an appropriate knowledge management tool.

The aim for the research project is:

To determine a methodology for identifying the appropriate knowledge management tools for any particular working environment.

This has been achieved by meeting the objectives that were set. The need for a methodology was established both through the literature review and through investigating the present position of knowledge management in two different organisations. One of the experts, Dr. Balafas, also highlighted the potential problem of the complexity of using the house and grid, which also verifies the need for a methodology to guide users through the process. Two tools were proposed that will aid a manager to select an appropriate knowledge management tool given a knowledge problem in a specific working environment. The framework and methodology developed showed how the toolset can be used to achieve selecting the knowledge management tool and offers a systematic way of evaluating knowledge management tools, knowledge problems and the associated barriers to success.

11.4 Research Limitations

The limitations that affected this research were:

1. Finding suitable case studies

Finding suitable case studies proved to be difficult. There were issues with finding organisations that were willing to provide appropriate case studies. One issue was finding studies that involved specifically selecting knowledge management tools. The other issue was finding organisations that were willing to allow both access to the necessary information and the time to spare to allow the research to be carried out. Several companies were approached including Rolls Royce, BAE Systems and Airbus as well as the two that were used, AstraZeneca and Nottinghamshire County Council.

There was the potential of a case study at Rolls Royce that could have been used to apply the house to. Unfortunately the project was moved to a different department and it was no longer possible to gain access to the project. Due to the cut backs that have occurred at BAE Systems it was not possible to pursue the contacts with this organisation. Airbus were willing to take part in the research but did not have any case studies or projects that were suitable at the time and the contact person at this organisation eventually moved to a different company making it impossible to follow up any further. Eventually only the two organisations used were found to offer potentially suitable case studies to pursue.

2. Time

For this research there were two issues with time. The first was that any case studies or action research needed to be completed within the timeframe of the thesis. Projects in organisations tend to take a while to complete. To use the house as a tool to select a knowledge management solution and then to implement that solution in the organisation and decide whether the solution is successful or not, takes time as was shown with the case study at Nottinghamshire County Council. The council are still in process of implementing SharePoint and, therefore, the outcome suggested by the analysis of the house cannot be compared to the actual outcome of the implementation.

The second issue with time was based on the time people had to spend answering questions and being involved with the research. The interviews carried out are based

on people's willingness and having the time to spend talking about their experiences with knowledge management tools. The evaluation by the experts also depended on the experts being willing and able to give up some of their time to read through chapters of the thesis.

11.5 Further Work

Three areas of further work were identified:

- **Further case studies**

Additional case studies are required to be able to assess the framework and methodology that were developed in chapter ten. Case studies are required that could use all the tools and run through the whole framework that has been developed. This would highlight if there are any other applications of the toolset that has been created, such as if the house could be used to select appropriate software applications that are not connected to knowledge management problems. Further case studies could also highlight if there is a need for any additional tools or how to search for knowledge management tools that are new or have not been previously heard of.

- **Online Tool development**

The house could potentially be developed as an online tool. The house would benefit from this, making it easier to use and simpler to follow the methodology that has been created. Providing an online tool would help the user populate the house by prompting them to complete each section of the house separately with the results automatically generating the completed house. An online version would still offer the flexibility but avoids having to set up the spreadsheet diagram which would make it quicker to use. With online instructions at each stage accompanying the online toolset, this solution would address some of the concerns the experts raised concerning the ease of use of the tool and the time taken to populate the house.

Revisiting Nottinghamshire County Council

The case study carried out at Nottinghamshire County Council was only involved in the initial stages of the council's project. Although using SharePoint as the tool had been decided at the time of the case study, the project was still at the early stage of putting together a business case to secure the necessary funding. The project to implement SharePoint is still on going. At present, the document management systems are being migrated on to the new system. Further work would include following up on the success and problems of the SharePoint implementation once it was live. The results of the implementation of SharePoint could have been compared to the results suggested by the analysis performed using the house. This would have shown if the house had accurately portrayed the potential outcome of using SharePoint as an electronic document system.

11.6 Research Contribution

The research fills the gap that has been found in the third of the twelve steps process to implement a knowledge management solution (Dawson, 2009). The third step in the implementation process suggested finding a knowledge management tool to solve a knowledge problem but did explain how this could be done.

The literature review in chapter two showed that no methodology existed to help managers select a knowledge management tool for a given knowledge problem. Further investigation in industry confirmed that organisations did not pursue a systematic method for selecting tools or evaluating the knowledge management tools that the business was already using. The research therefore contributes by providing the framework, methodology and the toolset to fulfilling the third step of the implementation process.

11.7 Conclusion

The research has successfully achieved its aim by providing a systematic methodology for selecting knowledge management tools for a given knowledge problem. The toolset can be used in a business environment to help managers, consultants and knowledge workers on all levels to select a knowledge management tool.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

A review of the literature is conducted in order to meet the first objective that was set in chapter one. The literature is examined to identify how organisations are approaching knowledge management and, in particular, how knowledge management tools are being selected. The success of both knowledge management implementations and knowledge management tools is investigated and the barriers to success are determined. By understanding the current literature, the gaps in the research have been identified so that they can be further investigated when carrying out the research in the selected organisations.

2.2 Define knowledge and knowledge management

To be able to investigate how organisations are approaching selecting knowledge management tools a clear understanding is required of the meaning of knowledge and knowledge management in an organisational context.

2.2.1 Knowledge

Benbya (2008) describes data as streams of raw facts, often numeric such as the cost of a product, information as factual and often textual, and knowledge as inferential and abstract. Serban and Luan (2002) further describe the concepts of data, information and knowledge and the connection between them in figure 2.1.

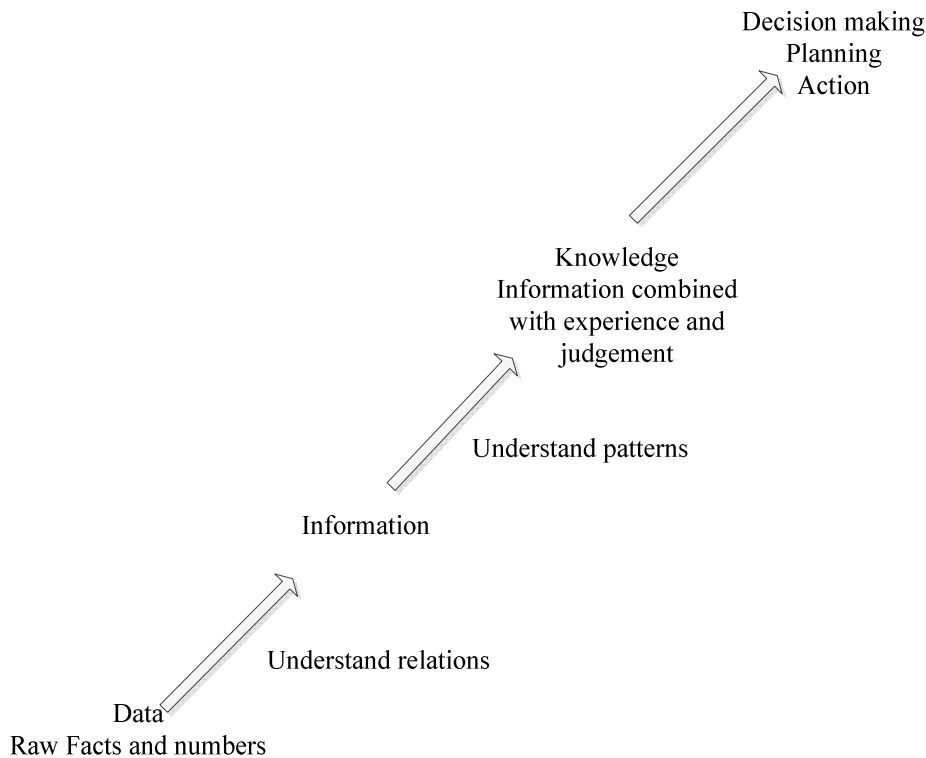


Figure 2.1: From Data to Knowledge (Serban and Luan 2002)

Figure 2.1 shows that the starting point to achieving knowledge is data. Data are described as ‘the building blocks’ and are raw facts. When a collection of data becomes information, it gains meaning in the form of relevance and purpose (Druker, 1999). Value is added to data in several ways: context, categorisation, calculation, correction and condensation (Davenport and Prusak, 1998).

Davenport and Prusak (1998) define knowledge in relation to organisations as

‘a fluid mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of the workers. In organisations it often becomes embedded not only in documents or repositories but also in organisational routines, processes, practices and norms.’

Due to this research being carried out within an organisational setting this is the definition of knowledge that will be used.

2.2.2 Knowledge Management

From the definitions of knowledge in 2.2.1, it can be seen that knowledge includes contextual information and it follows that knowledge management would include information management.

There are many different definitions to be found in the literature for knowledge management. Knowledge management is defined by Liebowitz (1999) as

'Dealing with the creation, securing, capturing, coordination, combining, retrieving and distribution of knowledge'

While Petrash (1996) defines knowledge management as

'Getting the right information in front of the right people at the right time'

Borzillo et al (2008) focus on an organisational description of knowledge management suggesting that it is *'the improvement of organisational abilities on all levels of the company by better treatment of the resource of knowledge'*.

For the purpose of this thesis the definition by Du Plessis (2002) will be used:

'Knowledge management is a planned, structured approach to manage the creation, sharing, harvesting and leveraging of knowledge as an organisational asset, to enhance the company's ability, speed and effectiveness in delivering products or services for the benefit of clients, in line with its business strategy.'

In order to manage knowledge, four perspectives need to be considered: people, process, culture and technology.

2.3 Organisations and knowledge management

Knowledge Management (KM) is still being called one of the 'hot' topics in organisations today (Du Plessis, 2008) having been referred to as the 'hottest' topic by Liebowitz back in 2000. This accounts for the implementation of knowledge management initiatives in organisation continuing to be seen as a growing trend (Du

Plessis, 2008). Businesses are realising the importance of being able to create and utilise knowledge in their organisations in order to gain a sustainable competitive advantage and be able to offer better value to their customers.

Traditionally resources vital to an organisations success and adding value to a business has included capital and land. More recently, organisations are realising that knowledge and the knowledge of its employees is a vital asset to a company's success (Benbya, 2008). Knowledge, however, is not seen as easy to manage as other resources as it cannot be managed separately from knowledge workers. It is described as an intangible asset and as such organisations have discovered that knowledge is hard to measure and establish the impact it has on business performance and initiatives.

Mertins et al (2003) discovered that the reasons businesses became involved in knowledge management were to:

- Gain competitive advantage (79%)
- Increase marketing effectiveness (75%)
- Develop customer focus (72%)
- Improve product innovation (64%)

Desouza and Paquette (2011) also suggested that knowledge management programmes are important for the strategy and competitiveness of an organisation, with another common reason to introduce knowledge management being to promote the sharing of knowledge. Knowledge Management (KM) initiatives should be introduced to solve a company problem and managing KM should be part of everyday business processes and activities. Ideally workers should not have to stop working to carry out KM activities.

There are some common mistakes associated with knowledge management initiatives including (Desouza and Paquette, 2011):

- relying on technology
- implementing KM because a competitor did

- Failing to address ‘what is in it for me?’
- Workers are unlikely to exchange knowledge for the fun of it.

2.4 Tools and techniques

Knowledge management tools and techniques are used as part of knowledge management along with processes, strategies and methodologies (Liebowitz, 1999). These IT tools are seen as ‘enablers’ allowing organisations to share and process knowledge, with IT tools in particular giving businesses the capacity to use knowledge both instantly and globally (Mohamed and Mohamed, 2008). This is seen as a key feature by organisations in order to remain competitive in today’s market.

2.4.1 Definition of KM tools/techniques

Knowledge management tools are defined as

‘Technologies which enhance and enable knowledge generation, codification and transfer’ (Ruggles, 1997)

This is the main definition that has been found whilst researching knowledge management tools and the one that is always referred to. Al-Ghassani et al (2002) confirm that few authors have defined knowledge management tools and this is still evident in the more recent research that is available. The above definition does appear to refer to technologies and not the non IT techniques and people sides of knowledge management.

Knowledge management systems are defined as IT based systems designed to support and enhance organisational processes of knowledge management and support the process of creating and integrating knowledge into the business (Alavi and Leidner, 2001).

The role of IT in knowledge management initiatives has been debated in the literature following knowledge management research being blamed for concentrating on the technology aspect of knowledge management (Mohamed and Mohamed, 2008). It was concluded that knowledge management is not just about IT but that IT

is seen as an enabler to achieving knowledge management in organisations (Mohamed and Mohamed, 2008; Tyndale, 2002). Chong et al (2007) suggests that technology is one of the most critical success factors though other factors for a successful knowledge management strategy include culture, leadership and measurement. It is suggested that technology is important but that its purpose is simply to provide tools to support humans in the sharing of knowledge and facilitate the knowledge management process (Tyndale, 2002; Merono-Cerdan et al., 2007). This leads to the conclusion that not all tools and techniques are going to be IT ones although IT tools are important.

The recent advances and the ever changing nature of IT mean that new tools that could be used within the realm of knowledge management will continue to come onto the market. It has also been found that the type of tool used can depend on the type of knowledge for which it will be used. Probst and Borzillo (2008) state that IT tools are best at dealing with explicit knowledge whilst the non IT tools and techniques are preferable when dealing with tacit knowledge. The advances in IT tools that are taking place, especially in fields such as artificial intelligence, object orientated databases and neural networks, could potentially see the balance of this division moved (Mohamed and Mohamed, 2008).

2.4.2 Classification of Knowledge Management tools

This section investigates which tools and techniques are discussed in research papers, how tools have been classified and new tools that are beginning to be used in organisations. Tools have been grouped together in two main ways. Al-Ghassani et al (2002) suggest that the classification has been based on either knowledge management sub processes or the technology families to which the tools belong. It is necessary to understand what tools and techniques can be used in an organisation to be able to meet the aim of this research in identifying an appropriate tool.

Classification by knowledge management processes

The knowledge management models that the classifications have been based on were created by different authors. Ruggles (1997) split knowledge management into

generation, codification and transfer and related the knowledge management tools to these three sections. An example of this is Lotus Notes and NetMeeting which are tools that would facilitate knowledge transfer. Al-Ghassani et al (2002) showed that this pattern was also followed by breaking down knowledge management into acquire, store, deploy and add value and then looked solely at web based tools such as Action Technology Tools and Documentum relating them to the 'add value' stage. It can be seen that the knowledge management tools were explored at vendor level as they were all software applications that were available at the time. This leads to the problem that applications can not only become obsolete but that their functionality also changes over time to address the new demands of the market (Al-Ghassani et al 2002). This would suggest that, when studying knowledge management tools in the long term, the results found may not always be as useful as they were when they were first reached.

Other authors have bypassed these problems by using generic categories for the tools (Al-Ghassani et al., 2002). These generic categories are then matched to the various knowledge management processes. Jackson (1998), for instance, suggests that for the process of storage the tools would be 'linking, indexing and filtering'. Communication processes involve tools such as 'sharing, collaboration and group decisions'. Laudon and Laudon (2000) also used this method with tools such as Office Automation Systems (i.e. word processing and desktop publishing) for knowledge distribution and Group Collaboration Systems for knowledge sharing. All the tools mentioned are IT tools and there is no uniform naming scheme to be found amongst the tools suggested by the authors.

Classification by technology group

Al-Ghassani et al (2002) suggested that the second method used to classify tools was by technology group and found that these were not matched to knowledge management processes. Al-Ghassani et al (2002) further suggests that classifying knowledge management tools by the technology group that they are based on is not very useful to an organisation.

Tyndale (2002), however, also classified tools by technology groups and then matched them to knowledge management activities. These activities were then broken down into sub processes. A tool, when being matched to a knowledge management activity, would need to address all the sub processes as well. The knowledge management activities and their sub processes that were identified by Tyndale (2002) were:

1. Creation
 - Capture
 - Generation
 - Gathering
 - Absorption
 - Assimilation
2. Organisation
 - Interpretation
 - Filtering
 - Codification
 - Categorization
 - Amalgamation
3. Distribution
 - Publishing
 - Face-to-face
 - Dissemination
 - transmission
4. Application
 - Process
 - Change
 - Revise
 - Amendment
 - Review

Tyndale (2002) suggested sixteen technology groups and states that there are tools associated with those groups but does not give details of them. When comparing these to those suggested by Jackson (1998) and Gallupe (1998) it can be seen that the groups proposed by Tyndale (2002) include those offered by the other authors. The following are the groups suggested by Tyndale (2002):

1. *Intranets*: This is a private internet-based network system used to share knowledge (Gallupe, 1998). Tyndale (2002) further describes it as a company wide information distribution system that allows employees access to company documents, software, scheduling etc. Content can include, but is not limited to calendars, directories, policies and company newsletters.
2. *Web Portals*: This is a web site acting as gateways providing links to other sites. These can be personalised by the user.
3. *Content Management*: These can include both internal and external web sites and databases and, again, can be personalised by the user. Kaiser et al (2008) grouped content management and document management systems together and referred to them as systems that would be suitable for 'structured document and data conservation and representation'.
4. *Document Management Systems*: Allows knowledge to be collected, stored and distributed. Typical features of such a system can include storing files in a central area, version control of documents, managing access to files and structured indexing and search facilities (Tyndale, 2002; Jackson, 1998)
5. *Information Retrieval Engines*: These are used for searching, indexing and recalling data in particular text and unstructured forms (Tyndale, 2002). Jackson (1998) suggests that the advent of the internet has accelerated development in this area. An increase in the amount of information available to businesses coupled with organisations requiring that knowledge quickly has led to this function becoming critical to organisational success (Jackson, 1998).
6. *Relational and Object Databases*: Databases are used as a means to store information and can show relationships and links. Kaiser et al (2008) suggest that they can be used for lessons learnt logs and best practices.

7. *Electronic Publishing Systems*: These systems are used to distribute knowledge in digital format (Tyndale, 2002).
8. *Groupware and Workflow Systems*: These computer based systems are used to allow people to communicate, co-operate, solve problems and coordinate (Tyndale, 2002; Merono-Cerdan et al., 2008). Kaiser et al. (2008) suggest they are used for information transfer and allocation but include portals as well in this group, whereas Tyndale (2002) does not. It is also suggested that this is a very general term and common features of groupware include e-mail, newsgroups, videophones or chat though Merono-Cerdan et al. (2008) include documents and best practices (document repositories), expert directories, yellow pages and online catalogues. Kaiser et al. (2008), however, label email, news groups and forums as uncontrolled interaction opportunities. This highlights the lack of a clear classification of knowledge management tools and techniques into both general technology groups and tools that are seen as features of a group.
9. *Push Technologies*: This allows information to be sent to the user without them having to retrieve the information themselves.
10. *Agents*: Intelligent software agents are programs that are used to filter out the knowledge required. They locate and gather information from various online sources (Tyndale, 2002; Gallupe, 1998).
11. *Help Desk Applications*: These allow organisations to manage internal and external clients. Typical features include problem resolution, a knowledge base, call tracking action logs and call history.
12. *Customer Relationship Management*: This provides a means of collaborating and storing knowledge about a customer to be able to satisfy the customer's needs.
13. *Data Warehousing*: This is an organisation's central store of data. Merono-Cerdan et al (2007) groups both data warehousing and data mining together as decision support technologies which gives workers the ability to make decisions and solve problems.
14. *Data Mining*: Defined by Tyndale (2002) as the process of selecting, exploring and modelling large amounts of data to discover patterns in the data.

15. *Business Process Re-engineering*: This is defined by Davenport and Short (1990) as ‘analysis and design of workflows and processes within and between organisations’. Tyndale, in his evaluation of technology groups, says little else about business process reengineering in terms of knowledge management and it is not mentioned by anyone else.
16. *Knowledge Creation Applications*: Features of this group include brainstorming applications, concept mapping, mind mapping and decision support applications. Kaiser et al (2008) also include whiteboards as part of creativity supporting systems.

When the technology groups above were matched with the knowledge processes highlighted previously, Tyndale (2002) discovered that a majority of these groups could fulfil all the knowledge processes that were identified. This could potentially be because the knowledge processes are not specific enough, or the technology groups are too general and large and a more useful comparison would be to look at specific tools rather than a general group of tools. Tyndale (2002) found that the groups that could not fulfil all the knowledge management processes included push technologies and help desk applications that did not contribute to knowledge creation. It was concluded by Tyndale (2002) that some of the technology groups were being used together rather than as standalone solutions in order to produce a more complete knowledge management solution, an observation also supported by Gallupe (1998).

Classification of non IT tools and techniques

It becomes apparent when looking at the classifications that the inclusion of non IT tools or techniques into a classification system is rarely investigated, even though the importance of the people side of knowledge management is stressed by different sources (Ruggles, 1997; Merono-Cerdan et al., 2007). A paper by Merono-Cerdan et al (2007) did address classifying the non IT tools that are used in knowledge management to some degree. These tools were grouped into three sections as follows:

1. *Spontaneous knowledge transfer initiative*: Merono-Cerdan et al (2007) suggests that these are areas an organisation creates where employees can talk allowing knowledge to flow informally. They stress that these are not organised meetings but that employees go to them and chat about their current work on an informal basis.
2. *Mentoring*: Mentoring is seen as benefitting an organisation by allowing knowledge to be transferred from expert to protégée, in particular the transfer of tacit knowledge which IT tools find harder to address (Swap et al., 2001). Mentoring aids organisational learning and cross departmental communication (Singh et al., 2002; Merono-Cerdan et al., 2007)
3. *Teams and communities of practice*: Merono-Cerdan et al (2007) suggests that teams are small groups of people brought together by a common purpose to achieve set goals. These teams can help with knowledge creation and innovation. Communities of practice can be defined as cohesive groups that share and develop knowledge (Borzillo et al., 2008). They are formed when people come together through a common interest to build and share knowledge. Joining a community is done on a voluntary basis whereas teams are put together by managers to achieve set goals. Online communities of practice occur in organisations (Sharratt and Usoro, 2003) allowing membership of a community to include people that are located in various departments and different geographical areas to share knowledge more easily. This would suggest that a community of practice is not just part of a non IT group but should also be part of a technology group.

2.4.3 New tools: Web 2.0 Technologies

The advancement of technology will see the continuing trend of new tools becoming available (Chui et al., 2009). One of the more recent groups of these tools are known as web 2.0 technologies with Sinclair (2007) reporting that web2.0 is the closest technology to knowledge management. Web 2.0 technologies refer to new digital platforms for generating, sharing and refining information (Benbya, 2008). Web 2.0 is described by Tredinnik (2006) as ‘ceding control over applications to users’

allowing users to extract data and information and reuse that information and data in a flexible way which increases the importance of user participation.

The most widely used of these tools in organisations, according to Chui et al (2009), are:

- Blogs, podcasts, video casts
- Wikis, commenting
- Social networks, network mapping
- RSS feeds, tagging, ratings, user tracking
- Prediction markets, information markets

Lynch (2008) states that organisations are continuing to increase their usage of these tools and that the main reason for adopting them is to manage knowledge. A survey carried out by McKinsey (2008) found that 83% of those surveyed were using web 2.0 technologies to manage knowledge. They are also being used to tackle the problem of storing and sharing knowledge within the business, to foster collaboration and enhance company culture. Chui et al (2009) describe the web 2.0 technologies that are available and the category of technology that the tools belong to (Table 2.1).

Table 2.1: A range of Technologies (Chui et al, 2009)

Web 2.0 technologies	Description	Category of technology
Wikis, commenting, shared workspaces	Facilitates creation of content/applications across large, distributed set of participants.	Broad collaboration
Blogs, podcasts, videocasts, peer to peer	Offers individuals a way to communicate/share information with broad set of other individuals.	Broad communication
Prediction markets, information markets, polling	Harnesses the collective power of the community and generates a collectively derived answer.	Collective estimation
Tagging, social bookmarking/filtering, user tracking, ratings, RSS	Adds additional information to primary content to prioritize information or make it more valuable.	Metadata creation
Social networking, network mapping	Leverages connections between people to offer new applications	Social graphing

No other classification of web 2.0 technologies has been found that examines the tools in terms of knowledge management processes.

2.4.4 Conclusion

Classification of knowledge management tools and techniques is normally limited to IT technologies and does not investigate the non IT options that exist to any great extent, and leaves out the more recent technologies such as web 2.0 developments. This is due, in part, to tools not being originally created as knowledge management tools but as tools that have been applied to the field of knowledge management and, also, the ever changing world of technology introducing new tools and ideas. The classifications that have been carried out show that tools can at times be considered at vendor level, investigating the software applications available, and at other times looking more generally at the technology groups or occasionally tools that are seen as features of those groups. It can also be seen that the classification of tools that is

available from the literature may not always offer the knowledge manager a clear solution as to which tool or technique may be the most suitable for an organisation to employ or even that a tool can be termed as a knowledge management tool or technique. It can be concluded that there is not only no finite list of tools but also no clear way to classifying these tools in a manner that could be useful to the knowledge manager and the organisation.

2.5 Knowledge management tool selection

Organisations are having difficulty in knowing which tool or technique will yield the best results when applied to their situations in order to meet their needs (Ruggles, 1997; Yu et al., 2007; Merono-Cerdan et al., 2007). When selecting a knowledge management solution, organisations should carefully consider the specific business goals that the solution needs to meet as well as the organisation's strategic orientation (Probst and Borzillo, 2008; Merono-Cerdan et al., 2007).

Other problems that are further challenging businesses in being able to select an appropriate tool is the rapid advancement in technology which has led to new tools such as web 2.0 technologies becoming available and also the abundance of tools of all varying types that can be used in knowledge management (Mohamed, 2008). Ngai and Chan (2005) state that organisations need to be able to evaluate possible tools in order to be able to select one that will achieve the organisational goals that have been identified.

As part of the process of implementing a knowledge management solution, Dawson (2007) suggests, as step two in the process, that a knowledge management solution needs to be found in the context of the knowledge problem that is being solved. This step of the implementation process for a knowledge management solution has also been mentioned by Buyokoztan and Feyzioglu (2008) who suggest that in order to implement a knowledge management project successfully a suitable knowledge management tool needs to be selected. Liebowitz and Megbolugbe (2003) also have, as part of a knowledge management methodology, a step that requires selecting an appropriate tool or technique. Although selecting an appropriate tool is seen as

important part of the implementation process there is limited research available in how this step should be carried out.

2.5.1 How to select a knowledge management tool

Ngai and Chan (2005) investigated a framework that could be used in the selection of knowledge management tools. They applied an AHP model (Analytic Hierarchy Process) in order to find the most suitable tool, given certain criteria. However, this was only applied to IT tools that had been designed specifically as knowledge management tools and not any other IT tools or even non IT tools and, more specifically, was used to compare different software supplied by vendors such as Microsoft SharePoint and Knowledgeware. Ngai and Chan (2005) decided that there were three essential evaluation criteria that needed to be considered when selecting a suitable tool. These are cost, functionality and vendor. These three factors were broken down into criteria and sub criteria and the tools were analysed against the criteria. This decision making tool that has been developed selects the technology aspect of a KM initiative without taking into account the people, culture or business processes that have been shown in the definition of KM (section 2.2.2) to be a part of managing knowledge.

Al-Ghassani et al. (2002) also examined how tools and techniques may be selected. After investigating the classification of knowledge management tools they concluded that classifying tools into technology groups was not useful to an organisation when trying to identify an appropriate tool. It was also found that there was a need to develop other frameworks for selecting tools, with Benbya (2008) concluding that no framework exist to select a tool.

2.5.2 Conclusion

Having examined the available literature on selecting a knowledge management tool, it can be concluded that it is a necessary step in the implementation of a knowledge management initiative but that no methodology has been suggested that can be applied to all the different types of tools and techniques.

2.6 Success and barriers

Implementation of knowledge management initiatives is not always as successful as expected (Dawson, 2007). Storey and Barnett (2000) suggest failure rates of over 80% for knowledge management initiatives. By studying the reasons for both the successes and failures of these initiatives and understanding the barriers that exist, organisations can include strategies that will help them overcome these difficulties and achieve successful knowledge management techniques (Du Plessis, 2008). Chua and Lam (2005) state that more cases of success stories are found than that of failure and those organisations that do fail are rarely named. While investigating the literature available it was noted that a majority of it focused on general KM implementation barriers and did not look specifically at the tools and techniques that were being used. The tool that appears to receive the most research was communities of practice.

Davenport et al (1998) investigated the success of knowledge management projects. One of the first steps taken was to identify success indicators in order to decide whether a project could be deemed a success or not. The success indicators used by Davenport et al (1998) are:

1. Growth in the resources attached to the project which included people and money.
2. Growth of knowledge content and of the number of people using the knowledge management solution
3. Does the project rely on one or two individuals without whom the project would fail? This implies identifying the project as an organisational initiative and not a personal one.
4. Evidence of financial return.

In order for a knowledge management project to be classed as successful Davenport et al (1998) suggested that it had 'virtually all the indicators' and one that was not successful had 'few or none' of the indicators. The indicator that was the hardest to determine, even amongst those projects that were classified as successful, was that of financial return. It was noted that other papers that investigated reasons for the

success and failure of knowledge management solutions did not state the criteria on which their decision was based nor did they define success in any way. Chua and Lam (2005) also concluded that what constituted success or failure of a knowledge management project was not commonly discussed.

2.6.1 Barriers to successful knowledge management initiatives

Davenport et al (1998) identified eight factors that influenced the success of a knowledge management project and these eight factors have been regularly found in much of the literature though other factors have been highlighted. The following are the eight factors by Davenport et al (1998):

1. *Link to economic performance or industry value:* The cost of knowledge management implementations can be large and organisations want to see a return on their investment (Du Plessis, 2008; Davenport et al., 1998). Du Plessis (2008) states that this is very difficult to achieve due to knowledge being an intangible asset. Davenport et al (1998) suggests that the benefits can be shown by linking initiatives to financial return, competitive advantage or improved customer satisfaction. Although some models and measures have been suggested to achieve this, no standard model has been accepted in the world of knowledge management (Du Plessis, 2008; Liebowitz, 2000)
2. *Technical and organisational infrastructure:* While knowledge management is not only about technology, the latter does play an important part and as such can impose barriers. Some of the barriers discovered by Davenport et al (1998), Du Plessis (2008) and Chua and Lam (2005) are:
 - people using the systems need to have the relevant skills to produce the best results
 - technology needs to be kept up to date with both the business processes and technological advances
 - the cost of implementation can be large
 - systems need to be maintained and backed up.

It could be argued that some of these barriers apply to any technology system and are not specific to a knowledge management system.

3. *Standard, flexible knowledge structure*: One main barrier was found to be that knowledge was not structured in a meaningful and useful way making it hard to find, understand and reuse (Davenport et al., 1998; Chua and Lam, 2005). Du Plessis (2008) indicated that it is critical to understand which knowledge to keep and what should not be kept. The dynamic pace at which knowledge can grow making this more of an issue.
4. *Knowledge friendly culture*: This is seen as the biggest barrier to successful knowledge management initiatives (Storey and Barnett, 2000; Du Plessis, 2008; Davenport et al, 1998). Organisational culture is defined by Hofstede (1991) as ‘the collective programming of the mind which distinguishes the members of one organisation from another’ and is seen to incorporate the norms, beliefs, symbols and values of an organisation (Wilson, 2004). The culture of an organisation needs to support knowledge sharing ensuring workers feel that there is a level of trust, recognition and openness in order for knowledge management to be successful (Davenport et al, 1998). Both Wilson (2004) and Du Plessis (2008) state that it has been found that organisations with a similar purpose do not necessarily have a similar culture. Du Plessis (2008) concludes that there will never be a blueprint for knowledge management implementation due the differences in organisational culture and that the most successful organisations will adapt their knowledge management culture to fit in with their organisational culture. The culture of an organisation is perceived by Davenport et al (1998) and Wilson (2004) as one of the hardest things to change for a business.
5. *Clear purpose and language*: Davenport et al (1998) suggests that it is important for an organisation to have clear understanding of the terms that are associated with knowledge management. This is especially true across large organisations where there are more people involved and there is a greater risk of concepts being interpreted by different people in different ways (Du Plessis, 2008).
6. *Change in motivational practises/user acceptance*: Workers need to be encouraged to share knowledge and use knowledge management systems (Liebowitz, 2000; Bishop et al., 2008; Davenport et al., 1998). Dawson and Richardson (2007) suggest that if users see no value in using a knowledge

management system then after initial usage they will stop participating. Rewards that have been suggested in order to motivate people have varied from financial to non-financial ones and include laptops, frequent flyer miles and peer recognition (Davenport et al., 1998; Bishop et al., 2008). User acceptance was found to be a cause for project failure by Chua and Lam (2005) who concluded that the users' requirements had not been understood. Both Dawson and Richardson (2007) and Du Plessis (2008) suggest that carrying out interviews and surveys prior to implementation would help to overcome this.

7. *Multiple channels for knowledge transfer:* Davenport et al (1998) states that knowledge can be shared in many ways including people meeting face to face. To be successful the knowledge manager needs to recognise and encourage this. It is also suggested by Du Plessis (2008) that knowledge transfer is a social activity whether technology is involved or not making culture an issue. It is noted that knowledge sharing is more likely from peer to peer but not as easily achieved up or down the hierarchy of a business.
8. *Senior management support/buy in:* Knowledge management projects benefit from having senior management support though it has been found that buy in needs to be not just from senior management but also middle management and the knowledge workers themselves (Du Plessis, 2008; Davenport et al, 1998).

A further barrier that has been identified is time. Du Plessis (2008) states that time can be seen as a barrier to success with workers seeing knowledge management as extra piece of work to do and complaining that they do not have enough time to participate. This can be applied to knowledge 'experts' in particular where they feel that they are gaining little reward for imparting their knowledge into a system for others to use (Bishop et al., 2008; Dawson and Richardson, 2007).

2.6.2 Barriers to specific tools

There is not much literature that concentrates on the barriers or the success and failure related to specific tools or techniques as the literature has tended to

investigate knowledge management projects generally. Steward (1997) suggests knowledge management resources go unused because they are not useful. The work being carried out does not connect to knowledge tools or the knowledge tools do not connect to the work.

Two tools that have been reported on are Communities of Practice and web 2.0 technologies.

Barriers to success: Communities of practice (COPs)

Probst and Borzillo (2008) defined a successful community of practice as one where 'members regularly exchanged specific knowledge that contributed to developing a practice in a specific field'. They evaluated the results of questionnaires in order to decide if a community of practice was successful or not. Twelve communities of practice out of the fifty seven investigated were deemed to be unsuccessful and five main reasons were found for their failure:

1. *Lack of a core group*: The main reason for this was found to be a lack of time by the members.
2. *Low level of one to one interaction between members either by telephone or face to face*: In the example given by Probst and Borzillo (2008) this occurred when top management no longer funded and supported the initiative which was found to be a general reason for failure of tools.
3. *Rigidity of competences*: Reluctance to learn from others which can be related to the culture of an organisation.
4. *Lack of identification with the COP*: Members do not see their participation in COPs as meaningful and that the area of knowledge covered was too broad.
5. *Practice intangibility*: Failure of members to be able to understand and visualise the knowledge that was being shared and, therefore, members were unable to gain anything useful from the COP. Consequently, memberships of the COP dwindle.

All of these can be related to the general barriers discussed in section 4.1 and are not seen as specific to communities of practice.

Barriers identified by Steven and Kerno (2008) are time, regional cultures and organisational hierarchy, all of which were identified as general barriers to successful implementation of knowledge management solutions.

Barriers to success: Web 2.0 technologies

Chui et al (2009) identified six critical factors that affect the success of the tools that belong to this group. They are:

1. *Transformation to a bottom up culture needs help from the top:* This relates back to the management involvement and that web 2.0 projects will be more widely accepted by workers if senior managers are actively engaged in using the tool.
2. *The best uses come from users-but they require help to scale:* It has been found that the tools that are used are not necessarily the ones that an organisation expected to be used, neither are they necessarily used by the anticipated people or used in the way expected. For an organisation to get the best results from the tools they need to be flexible and support the development and usage of the tool.
3. *What's in the workflow is what gets used:* tools are often perceived as extra to everyday work and as such tend not to get the continued usage. After the initial period of excitement of a new tool to use, it tends to fall by the wayside if it is not part of achieving the daily routine. This again can relate to time.
4. *Appeal to the participants' egos and needs, not just their wallets:* This returns to the problems of motivating staff to use the tools provided. It is suggested by Chui et al (2009) that a more effective way to encourage participation was to recognise those who participate in more public business meetings.
5. *The right solution comes from the right participants:* This is a barrier that was found in general implementation, where it was suggested that, without the right users, then the stored knowledge was not always of value to the organisation.

6. *Balance of the top-down and self-management of risk*: The risks associated with web 2.0 tools are that users are worried about using the technology and that there needs to be some control over inappropriate content.

The potential barriers to web 2.0 technologies highlighted by Chui et al (2009) are ones that have been found as general barriers to knowledge management implementation.

2.6.3 Conclusion to success and barriers

There are many barriers to successful implementation of a knowledge management solution but a clear understanding of how the decision on whether a knowledge management project can be classed as successful or not has not been shown. Davenport et al. (1998) defines how a decision was reached but it is still not clear, due to the interpretation of 'virtually all' and 'few or none', which could easily be different from one person to next. There is very little literature which concentrates on the tools themselves or even mentions what tools were involved in the studies. The few that have been discussed do show that the barriers that were found to influence knowledge management implementations in general were also found to influence the success of specific tools, though further research on this area needs to be carried out to ascertain whether this is true of other knowledge management tools. To achieve the aim of this research, it is necessary to understand the reasons for success and failure in order to be able to select the optimum knowledge management tool in a given scenario, having taken into account the barriers that could exist.

2.7 Overall conclusions and identified gaps

The final part of objective one from chapter one required that the gaps in the literature be identified. Several gaps have been identified in the literature review. Although knowledge management tools have been classified in various ways, none of the classifications have shown a clear and easy-to-use method of classifying the tools in order to help managers identify and select potential tools. The classification of tools has been limited to IT tools and makes no provision for new technologies. The literature shows that managers need to select appropriate knowledge

management tools and this is an important part of the implementation of knowledge management solutions. It was discovered that knowledge management tools need to be selected based on solving a specific knowledge problem; however, no research has shown a systematic methodology that can be used to select tools. Many barriers to successful implementation and a few barriers to the tools themselves have been discovered but how to overcome the barriers has not been discovered and is another gap in the literature.

Overall, a flexible methodology is required to aid a manager in selecting an appropriate knowledge management tool given a knowledge problem. The methodology needs to consider the problem being solved, the knowledge management tools that are available, the potential barriers to success and how the barriers can be overcome as well as the people, processes and culture of the organisation.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter investigates the various approaches to research methodologies that could be utilised during this research. The research methodologies are examined to find the appropriate research strategy, design, methods and approach theory, given the research aims and objectives set in chapter one. The advantages and disadvantages of the various methods are discussed in order to clarify the most appropriate approach to the research that can be taken.

3.2 Research Philosophies

Epistemology is a branch of philosophy that relates to the nature and scope of knowledge and how knowledge is acquired (Galliers, 1992; Myers, 1997). There are two main research philosophies offering a high level view of research methodologies that are associated with an epistemological position (Myers, 1997; Bryman, 2004; Remenyi, 2012). They are positivism, also referred to as scientific and anti-positivism, also called interpretivism, and are described by Galliers (1992) as common research stances encountered in the natural and social sciences.

3.2.1 Positivism or Scientific

Positivism is the epistemological stance that '*generally assumes that reality is objectively given and can be described by measurable properties which are independent of the observer and their instruments*' (Myers, 1997). The purpose is to generate a hypothesis and to test it using mathematical and logical means. Minger's (2003) classification of research methods suggests positivism uses passive observation, measurements and statistical analysis. Experiments, both field and

laboratory, can be carried out as well as case studies and surveys for gathering data (Minger, 2003; Galliers, 1992).

3.2.2 Anti-positivism or Interpretivism

Anti-positivism is used to describe the alternative stance to positivism. It generalises the findings and allows the researcher to interpret the data and gain an understanding of the context and process of the situation (Bryman, 2004; Walsham, 1993). The researcher needs to understand the subjective meaning of the social action. Researchers, therefore, can obtain different results from the same studies. Anti-positivism is often associated with interviews and case studies as research methods.

3.3 Research Strategy

There are three research strategies quantitative, qualitative and mixed research. A quantitative strategy is usually associated with positivist philosophy whilst a qualitative strategy is normally associated with an interpretative philosophy.

3.3.1 Quantitative

Quantitative research primarily deals with numeric data and was developed in the natural sciences to study natural phenomena (Myers, 1997).

A deductive theory is often associated with a quantitative strategy and a positivist philosophy. A deductive theory starts with a theory or hypothesis that has been deduced by the researcher and subjects the hypothesis to empirical scrutiny (Bryman, 2004). A deductive theory requires the researcher to collect data and analyse the findings in order to either confirm or reject the original hypothesis. Figure 3.1 shows the process of deductive theory.



Figure 3.1: The process of deduction (Bryman, 2004)

3.3.2 Qualitative

Qualitative research was developed in the social sciences, enabling researchers to investigate social and cultural phenomena. Researchers who use data other than numeric, such as text and images refer to their research as being qualitative. Qualitative research can yield complex data and can be hard to analyse and draw conclusions from. The conclusions that are arrived at can be interpreted differently by different people leading to more criticism than quantitative research results.

An inductive theory is associated with a qualitative strategy. With this approach the theory is the outcome of the research, though qualitative research does not always generate a theory. The inductive process collects the data first and then explanations of the data are developed from analysis of the data (Edwards and Talbot, 1999)

3.3.3 Mixed Research

Mixed research involves using both qualitative and quantitative strategies. It therefore uses both inductive and deductive methods of research with the study having various types of data and different data collection methods. Table 3.1 below summarises aspects of the three research strategies.

Table 3.1: Summary of quantitative, qualitative and mixed research. Reproduced from Johnson and Christensen (2006)

	Quantitative research	Mixed research	Qualitative research
Scientific method	Deductive or 'top-down' The researcher tests hypothesis and theory with data	Deductive and inductive	Inductive or 'bottom up' the researcher generates new hypothesis and grounded theory from data collected during fieldwork
View of human behaviour	Behaviour is regular and predictable	Behaviour is somewhat predictable	Behaviour is fluid, situational, social, contextual and personal
Most common research objectives	Description, explanation and prediction	Multiple objectives	Description, exploration and discovery
Focus	Narrow-angle lens, testing specific hypothesis	Multi lens focus	Wide angles and 'deep angle' lens, examining the breadth and depth of phenomena to learn more about them
Nature of observation	Attempt to study behaviour under controlled conditions	Study the behaviours in more than one context or condition	Study behaviour in natural environments. Study the context in which behaviour occurs
Nature of reality	Objective (different observers agree on what to observe)	Common sense realism and pragmatic view of world	Subjective, personal and socially constructed
Form of data collected	Collective quantitative data based on precise measurement using structured and validated data collection	Multiple forms	Collect qualitative data. The researcher is the primary data collection instrument.

	Quantitative research	Mixed research	Qualitative research
Nature of data	Variables	Mixture of variables, words and images	Words, images and categories
Data analysis	Identify statistical relationships	Quantitative and qualitative	Search for patterns, themes and holistic features
Results	Findings that can be generalised.	Corroboration findings may generalise	Particularistic findings. Representation of insider viewpoint. Present multiple view perspectives.
Form of final report	Statistical report (e.g. with correlations, comparisons of means etc.)	Eclectic and pragmatic	Narrative report with contextual description and direct quotations from research participants.

3.4 Summary of Philosophies and Strategies

To decide on which research philosophy to apply, the researcher should take into account the nature of the research and complexity of the 'real world'. The selected method should reflect the objectives and aims of the research (Galliers, 1992; Brewer and Hunter, 1989). Information Systems (IS) research can be classified as either positivist or interpretivist. A trend is witnessing more researchers taking an interpretivist approach as the importance of the people aspect of IS is being recognised (Myers, 1997).

A mixed research approach was decided as the appropriate strategy in order to gain a better understanding of the research problem. The research used a predominantly interpretative philosophy using qualitative analysis as the research examined the behaviour of organisations in their working environment. Qualitative data was gathered and analysed in order to determine any patterns or themes in the organisations. However, some quantitative analysis of the data collected was also carried out.

3.5 Research Design and Methods

Bryman (2004) suggested that these two terms are often confused and the literature does show that the two terms are given different meanings by researchers. Bryman (2004) suggests that research design provides a framework for the collection and analysis of data. Research method is the term used to describe data collection and analysis techniques (Bryman, 2004; Remenyi, 2012).

3.5.1 Research Design

Researchers have identified several research designs (Galliers, 1992; Bryman, 2004; Remenyi and Williams, 1996; Edwards and Talbot, 1999). The following discusses those are the most predominant in the research literature as well and the designs that are in this thesis.

- **Experimental**

This involves carrying experiments in controlled environments in order to test a single factor. Two groups are often used to observe the effect of manipulating the single variable being analysed. This is aimed at the study of a particular subject or method. The advantages include that the researcher has control over the experiment, results are ensured, this is seen as a reliable research design and that individual factors are recognised. The disadvantages are that it over simplifies a complex problem by identifying one single variable to analyse, research bias and the possibility of the Hawthorn effect (Edward and Talbot, 1999).

- **Grounded Theory**

Grounded Theory is defined by Glaser and Strauss (2008) as '*the discovery of theory from data systematically obtained from social research*'.

Glaser and Strauss (2008) focus on utilising qualitative data, however, quantitative can also be used. Grounded Theory is aimed at researchers who are studying social phenomena and is used to generate theory. This involves constantly analysing and

coding the data with further rounds of collecting data. It is an iterative process that collects, analyses and theorises the data. This can be a time consuming process due to constant process of collecting and analysing the data. It can be difficult to see what theory is being discovered.

- **Case Studies**

Case studies can be used in many situations and is a common research design used in many areas including business and information science. Case studies are seen as well suited for IS research (Benbasat et al, 1987). Case studies can provide an in-depth investigation into an organisation.

Case studies are used to understand complex social phenomena. Yin (2009) defines a case study as '*an empirical enquiry that investigates a contemporary phenomenon within its real life context*' and can use multiple sources of evidence. Remenyi (2012) further defines a case study, stating that it:

- can be used to answer a complex or challenging research question
- has an empirical approach
- can involve many variables
- can recognise the context in which the research question is put
- is not extended over a long period of time
- uses multiple sources of data

Case studies can use a combination of techniques for data collection such as questionnaires, interviews and observations resulting in either a qualitative, quantitative or even a mixture of both research strategies being employed (Huberman and Miles, 2002).

The advantages of using case studies include that they allow an in-depth view of a situation, they capture the complexities of a situation and they focus on the local understanding of the participants. The disadvantages include finding suitable case studies, time constraints, and care needed for collection of data, and finding appropriate data (Edward and Talbot, 1999).

- **Action research**

Action research involves the researcher working alongside members of the organisation in order to solve a problem. The researcher and stakeholders define the problem to be investigated and collaborate to find a solution to the problem. Thus action research has three elements: research, action and participation (Bryman, 2004).

Collecting data can be carried out by detailed observation as well as interviews, and using multiple data collection techniques gives a broader perspective on the research. The data collected can be either qualitative or quantitative. Due to the collaborative nature of the research there are potential ethical issues to contend with as well as possibility of the researcher getting too involved in the situation and losing sight of the bigger picture (Cornford and Smithson, 1996).

3.5.2 Research Method: Data Collection Techniques

Collecting data can be a challenging aspect for research. The data collected needs to be the appropriate data to be able to meet the aims and objectives of the research. Access to data can present issues especially when dealing with organisations and collecting data within the timeframe of the research project (Remenyi, 2012). The three areas of concern when selecting appropriate data collection techniques are the validity of the data being collected, the reliability of the data and the feasibility of the data (Remenyi, 2012; Edwards and Talbot, 1999; Bryman, 2004).

There are a variety of data collecting techniques available. The following data techniques that are discussed are those that could be used to collect the data required for this thesis.

- **Surveys**

A survey is a means of 'gathering data about the characteristics, actions and opinions of a large group of people' (Tanur, 1982). Data is collected by means of self-completion questionnaires or structured interviews. A large amount of data is

collected and is a cross section of the sample being surveyed at one point in time. Surveys collect data from a set sample of people and there are a variety of sampling methods to achieve this.

The advantages of surveys include being able to collect large amounts of data, ensuring anonymity of respondents, showing relationships between the data and being seen as a valuable descriptive and explorative method of research design. The data collected can be either qualitative or quantitative.

The disadvantages of carrying out surveys are that they produce large amounts of data that need analysing, response rates can be low and the research can be biased and subjective.

- **Interviews**

Yin (2009) suggests that, for case study research, interviews can be the most important source of information. They can be carried out either as face to face interviews, telephone interviews or group interviews. The disadvantage of telephone interviews over face to face interviews is that the interviewer cannot observe the body language of those they are interviewing, the interviewees could be distracted and there is a cost for the phone calls involved.

There are several advantages and disadvantages to carrying out interviews. The advantages include the researcher gets a 100% response rate to the questions, further questions can be asked to clarify answers, the interviewee can be observed and rich data is collected. The disadvantages can include that interviews are time consuming, the analysis of interview response can take a long time and interviews can be hard to arrange.

Interviews can take three forms. They can be structured, semi structured and unstructured.

Structured interview questions are decided before the interview and are adhered to by the interviewer. They tend to be easier to analyse and are quicker to carry out. Semi structured interviews use questions, themes and topic areas as a guide and the

interviewer will use their judgement to follow up on areas of interest to their research. Semi structured interviews can be harder to analyse as there is a larger amount of data and the themes and topic areas can vary from one interview to the next. For unstructured interviews the interviewer will have decided only on themes or topics to be explored and will adopt a more passive role in the interview allowing the interviewee to talk about issues that concern them. Unstructured interviews result in large amounts of qualitative data that can be hard to analyse.

- **Focus groups and group interviews**

Focus groups are a form of group interview. Group interviews can have two or more people being interviewed at the same time, carried out by the researcher, often to save time. Focus groups tend to be larger with between four and ten people with the interviewer taking the role of facilitator (Bryman, 2004; Edward and Talbot, 1999). Both types of interview allow the researcher to gather information more quickly and offer a more complete picture of a situation as those being interviewed can interact and discuss topics more thoroughly. Large amounts of data can be gathered. The disadvantages are that strong individuals in a group may influence the other participants and large amounts of data will need analysing. The researcher may have less control over the interview compared to a one to one interview. They can be difficult to organise, especially in a work environment, as they entail finding a time when everyone can attend.

- **Questionnaires**

Questionnaires are a survey method for collecting data. Questionnaires can provide a good surface picture of a situation but do not offer the same in depth analysis of a problem as other research methods. The advantages are that they can be used to gather background information; they can reach many people and are reliable. The main disadvantage of questionnaires over using interviews is that a response from those sent a questionnaire is not guaranteed. Questionnaires only provide superficial information and respondents do not necessarily complete all the questions.

- **Brainstorming**

Brainstorming is a technique that is used to generate ideas. It is considered one of the best known techniques for creative problem solving (Rawlinson, 1986). It can be carried out in a group or individually. It involves participants thinking of as many things or solutions as possible about given idea or problem. The ideas that are generated are not to be judged by those involved, encouraging everyone to participate allowing the ideas to be as farfetched and potentially as innovative as possible (Arnold, 2005).

- **Archival and documentary research**

This type of research design relies on documentation as a data source. This can be historical documentation such as census and parish records or more recent documents. The advantages include that the documents are specific to the research. The disadvantages are more numerous and include the limited availability of documents, ensuring the reliability and validity of documents and accessing enough material to support the research.

3.5.3 Summary of Research Designs and Methods

A mixture of approaches is pursued in this research. This provides a better approach and understanding of the research being undertaken. The research design includes action research, allowing the researcher to observe and participate in a project being carried out at Nottinghamshire County Council (Chapter 4, section 4.3). This offered a valuable insight into the day to day issues that affect the organisation and permitted the researcher to observe the culture of the business. Case studies were also carried out, reported in Chapters 7, 8 and 9, affording an in depth investigation into the knowledge management problems at both AstraZeneca and Nottinghamshire County Council.

A survey approach was felt not to be appropriate, given the time restraints imposed at the county council (Chapter 4, section 4.6) and would be difficult to implement at

AstraZeneca. A survey would also not give the in depth study and understanding of the research problem that is required.

The primary data collection techniques used focussed on interviews. Telephone interviews were used at AstraZeneca (Chapter 5, section 5.2) due to the interviewees being located in Sweden, America and the UK. A semi structured approach was taken in order to allow the researcher to focus on the areas of interest to the research and to take into account the different backgrounds and involvement the interviewees have with the research area.

At the council the interviews took the form of small focus groups as well as one to one interviews. Questionnaires were not appropriate in this situation due to the time constraints imposed by the council (Chapter 4, section 4.6).

3.6 Conclusion

The investigation into research methodology shows that there are many considerations that need to be taken into account when deciding the most suitable research methodology. A multi strategy approach has been shown to be the most suitable, given the research aims and objectives set in chapter one. A combination of both qualitative and quantitative research was carried out. In order to meet the objectives set out in chapter one, both case studies and action research were used. A variety of data collection techniques were pursued including interviews, both face to face and by telephone, and focus groups.

CHAPTER 4

THE NEED FOR A SYSTEMATIC APPROACH TO KNOWLEDGE MANAGEMENT TOOL SELECTION

4.1 Introduction

This chapter aims to discover if there is a need for a methodology to select knowledge management tools, thus investigating objective two from Chapter one. It also starts to explore objective three, by interviewing knowledge workers to gain an understanding of the present situation within the organisation connected to tools already introduced into the working environment and the success and issues the tools and the users have faced.

The approach taken by Nottinghamshire County Council (NCC) to introduce a knowledge management tool was examined and led to this case study. An analysis of the methodology used by the council to select a knowledge management tool was carried out to determine whether the approach taken by the council was well structured and led to a successful result, or whether there is a need for a methodology to be developed. The areas that need to be taken into consideration to enable a quality software solution to be found for a given knowledge problem were highlighted by the case study. The council were producing a business case to secure the funds required to implement an information and knowledge management solution when this case study was undertaken.

The project to introduce the new tool was based in the Communities Department of the Nottinghamshire County Council. This department comprises of five main departments, including Highways and Cultural Services, which are further split into four or five smaller areas. These are then split again resulting in small teams with specific business goals. The departments vary widely in their roles and include areas such as Planning Services, County Parks, Libraries and Adult learning. The council

is influenced by government proposals and cuts, and is affected by elections and money issues, especially in the present economic climate.

4.2 The Information and Knowledge Problem at the Council

An investigation into the document management practices within the organisation was undertaken by the Information Manager. The storage and retrieval of computerised documentation files both within and across departments was found to be a major issue. There were also no clear file naming conventions which further exacerbated the problem of finding files again. Each department had a different approach to the naming of files and there were even different approaches within the same department. It was also noted that there were no processes in place for naming, saving and re-using files. At present, many of these files are paper based with any electronic copies being kept in a variety of places, such as users' machines, shared drives and various content management tools such as IBM's Content Manager, Doc Harbor and Google Docs. This has led to problems of finding documents, duplication of documents, version control and large amounts of printing. The Information Manager decided to find a tool that could be used across all the county council's departments to manage this problem as, on further research, it was found to affect the whole organisation. The council is, therefore, looking at introducing an Electronic Document Retrieval Management System (EDRMS) which will be primarily used to address their filing problems. Johnson and Bowen (2005) show that an EDRMS has the potential to solve some of the issues found at the council. No other information or knowledge problems were considered at the initial stages of the project.

The council has previously attempted to introduce content management applications, such as IBM Content Manager and Doc Harbor, which are still available to use but are not perceived as providing the functionality required, are not used regularly across the organisation and are not considered to be successful.

4.3 The Involvement of Loughborough University

The University's aim for the project was to investigate the process used by the council to select a knowledge management tool and to ascertain if there is a need for research to find a methodological approach for selecting such tools.

The objectives were to:

1. Document the selection process used by the council
2. Analyse the steps taken by the council
3. Understand the background of the council workers, the effect they could have on a solution and the effect they could have on the ability to make a decision
4. Determine whether the eventual decision made was both appropriate and the best solution in the circumstances
5. Determine what areas need to be considered when selecting a knowledge management tool
6. Determine if any knowledge management tools were already used at the council
7. Determine the success and issues with these tools

The council asked Loughborough University to help with a specific part of the project. This involvement allowed the method used by the council in the decision making stages of the project to be understood and gave a better understanding of other factors that could potentially influence a successful outcome, thus meeting the objectives set out above. Working in a council department gave a good insight into the daily work routines that existed and led to being able to observe the culture and issues of the organisation first hand rather than relying solely on feedback from interviews.

4.4 The Process for Selecting Knowledge Management Tools

The council decided to introduce a new solution into the organisation to address their information and knowledge problem. The decision was based on the fact that systems already available were not performing as required, although there appears to have been no research into understanding why.

The council have a policy of putting their requirements out to tender to find suitable software solutions. They have a tendency to use vendors they have used before or those that are seen as trusted, so the systems used tend to stay with the same providers, such as Northgate and Civica. This leads to limited research into finding new software and limits the software that can be used.

The system selected to be the EDRMS for this county council is SharePoint 2010. It was felt, by the council that, although the introduction of SharePoint would be a big undertaking, it would address their problem of managing documents. It was felt SharePoint also offered other functionality that could benefit the organisation, but research into this was only carried out once SharePoint had already been selected.

Investigation of the benefits that SharePoint could offer the organisation took the form of a 'benefit profiling' exercise to show the need for the investment and where potential savings could be made by the organisation as a result. This was undertaken in order to secure the funding for the project and was to be included in the business case that was being put together. This benefit profiling is the part of the project that Loughborough University became involved in.

4.5 Benefit Profiling Exercise

The benefit profile exercise was used to determine what benefits could be gained from using SharePoint, what issues may need addressing and how SharePoint would affect the performance levels of the business. This included an investigation into the functionality that SharePoint offered to see what other knowledge and information problems SharePoint could resolve. The profiles were then used in the business case that was put together by the Information Officer in order to secure funding for the project, by showing where savings could be made in the long term by implementing SharePoint. The University helped in the gathering the information required for the benefit profiles using the council's own methodology. This allowed the process they used to decide which tools should or could be used to address their knowledge problem to be observed and gave an understanding of why SharePoint had been selected.

For the initial stages of developing SharePoint, eight pilot areas were selected. Each pilot area was a department with around fifty to a hundred people and was selected on the basis that they volunteered to be part of the project. It was expected that they will eventually be testing the system in the work environment and be involved in the development of the tool to meet their needs. As part of the business case that is being prepared for the project, the eight pilot areas were asked to present the benefits that they felt SharePoint would offer their department. The objectives of the benefit profiling were to:

- Determine the benefits that will be achieved by introducing the system
- Determine if there are any “disbenefit” (the council terminology used for material disadvantages)
- Estimate the time spent on activities at present that could potentially be reduced by introducing SharePoint
- Highlight any issues or risks

The eight pilot areas tackled the benefit profiling on their own with the results being pooled together before being included in the business case. This was done to gain different opinions from each area without influence from each other’s findings. This also allowed the Information Manager to be able to understand the common issues that were prevalent within the teams. There was a two hour presentation from Microsoft on the features of SharePoint but, other than that, each area had little knowledge of what SharePoint had to offer. The University researcher was attached to one of the pilot areas, Planning Services, to help investigate the possible benefits of implementation in that department.

4.6 The Approach

The benefit profiling for Planning Services was undertaken by one member of the Planning Services team and the author. It soon became apparent that there was no set way of approaching this task and neither was there a process for completing a benefit profile. A form (appendix A) was provided to be filled in and returned to the Information Manager. The form comprised of six tables as shown by table 4.1.

Table 4.1: Contents of the benefit profiling form

Table number	Areas covered
First Table	Responsible officer and service area
Second Table	Description of benefit or disbenefit, measure to be applied, timescale for realisation, type of benefit
Third Table	Current/baseline performance level, improvement/deterioration expected, Key Performance Indicators (KPIs) affected
Fourth Table	Benefit that this benefit depends on
Fifth Table	Cashable benefit value, costs associated with delivery and measurement of the benefit, other benefits that this contributes to, dependencies on other programmes/projects
Sixth Table	Risks identified, likelihood, impact, action

A brief description for each heading was given but there was no advice as to how any of the information could be gathered.

With this form as the starting point, the project team endeavoured to fill in the categories that were asked for. The time given to collect the information was very short, at just two weeks, which limited the choice and accuracy of the approach taken. It was decided that interviewing members of Planning Services would be the best approach to gather potential benefits as it was felt questionnaires would be too time consuming to be produced, distributed, filled in, returned and analysed in the time available.

To discover the benefits of SharePoint for the Planning Services, interviews were carried out with members of the three teams that make up the department. The manager of Planning Services was also interviewed. The interviews with the teams were carried out in small groups with up to four members of a team at a time. Some of the advantages of interviewing in small groups, according to Blackburn and Stokes (2000), Edward and Talbot (1999), Steward and Shamdasani (1990) and Robinson (1999), are:

- Faster method of gaining information
- Opportunity for those interviewed to interact encouraging snowballing of ideas
- The ability to generate more critical comments

However, some disadvantages were also noted prior to carrying out the interviews. These were:

- Responses may be influenced strongly by one member of the group (Edward and Talbot, 1999)
- Group consensus caused by pressure to conform
- Conflicts of personality (Robinson, 1999)

During the interviews, employees were asked what problems they had with day to day activities and where they felt that they wasted time with tasks taking longer than necessary. Those questioned were informed that an electronic document system was potentially being introduced and were aware that it would be SharePoint but they were unaware of the full functionality that SharePoint could offer and had not used it before. This meant prompts, such as ‘would you use wikis?’ and ‘would a team site area and team calendars be useful?’, had to be used later on in the interviews once they had revealed the problems they encountered. A basic description of wikis and their functionality also had to be given as potential users were unaware of the possible uses and benefits of using wikis or team sites in a business scenario. The interviews also gave an insight into the issues with current tools that were available within the council.

4.7 Performance Baseline

The time spent by employees on existing tasks was required in order to estimate any time that could be saved by introducing SharePoint. Tasks that were expected to take longer when using SharePoint were also noted. Due to the limited amount of time to collect the information, a time and motion study could not be carried out. The timings that were gathered were, therefore, based on interviewees’ estimates. The timings were used to show if the new system would reduce costs and improve

productivity. It was noted that the timings would be very approximate but, as there had been no other studies or performance measures ever carried out, it gave a baseline to work from.

4.8 SharePoint

SharePoint is marketed by Microsoft as making it easier to work together by sharing sites and documents and managing the lifecycle of documents, allowing organisations to respond quickly to the changing business environment (Microsoft, 2011).

Representatives from Microsoft gave a two hour presentation to those involved in the project at the council, which included IT personnel and people from the pilot areas. The presentation was given after SharePoint had been selected as the tool that was going to be used and the talk was tailored to the needs and areas that were seen as being the main interest to the council. The PowerPoint presentation was accompanied by a demonstration but this created confusion amongst the audience as the many changes of web pages caused them to lose their bearings due to having little, if any, knowledge or contact with either SharePoint or the latest versions (2007/ 2010) of Office products which use a similar layout and content.

The reaction from those present showed that the sophistication and complexity of SharePoint was, potentially, going to be too much. The feedback from the audience showed that not all areas that were demonstrated were understood and some, it was felt, not even required. Those not required included wikis and blogs for which no one could see any use in their department. Other issues that arose from the demonstration were the need for incentives from the organisation to get users to complete people pages and team websites. Microsoft used giving a computer to the best designed people page as the incentive to encourage users at Microsoft to complete the people pages. The comments from the council ranged from 'At the council you will be lucky to get a free cup of coffee' to 'I wouldn't want to fill in the people pages as then no one will bother me'. This demonstrated the issues both with incentives and

motivating the staff as well as illustrating the lack of a knowledge sharing culture in the organisation.

Further research showed that there are some known barriers to SharePoint implementation, (McLeod et al, 2010) but that the council did not appear to have taken these into consideration. These include:

- SharePoint can be difficult to configure
- SharePoint provides too much functionality out of the box making it hard to develop
- Not as simple to use as expected

4.9 The Results

Table 4.2 shows a summary of the results of the benefit profiling exercise for the Planning department with fifty members of staff. The benefits that were found are listed and a description of them given. The third column shows the timings that were taken as a performance baseline in terms of the estimated number of days per year. For some benefits it was not possible to give timings. Following on from the benefits, Table 4.3 shows the disbenefits that were found, again with descriptions and timings, though some do not have timings as it was not possible to gage these. The completed benefit profiling form can be found in appendix B.

Table 4.2: Benefit profiling results

Benefit	Description of benefit	Baseline performance level <i>(Estimated days per year)</i>
Searchable document storage	Will enforce a naming convention, documented business processes and an indexing system (not available at present). Will reduce the time spent searching archives or waiting for documents to be returned from archives and reduce the likelihood of losing documents completely.	85.5 days spent searching for files. 1-2 days wait for files to return from archives occurs 3-4 times per year.

Benefit	Description of benefit	Baseline performance level <i>(Estimated days per year)</i>
Record management	Will give the ability to manage the lifecycle of stored documents and offer more control over their security.	No lifecycle management of documents exists. Limited security at present.
Reduced filing time	One area to file in and no printing out of paper copies. Less likely to lose files completely if processes and naming conventions are introduced (will need a filing structure and process in place to be successful).	80 days spent tidying up filing, normally between Christmas and New Year. 6 weeks spent logging incoming letters for support, objections etc.
Quicker collation of information	Easier and quicker to find documents if all in one place. (There are strict guidelines in place for the length of time taken to respond to enquiries and to provide information. Failure to comply results in fines.)	210 days collating for enquiries
Reduced duplication of documents	If documents are all in one place, everyone can access them, subject to the appropriate permissions, instead of retaining their own copy on their own machines. This would help with version control of documents.	No figures available as this is not monitored
Reduced printing	Reduction in time spent printing, cost of printing and the amount that is printed. (At present emails are printed out in full as there is nowhere to easily store them. The present email system does not allow archiving or moving of email to an external document store)	No figures available as this is not monitored
Improved disaster management	Decreased risk of losing paper files due flood damage (or fire). Some files are sole copies dating back to 1950s and others would be hard to replace. A flooding incident has already occurred in a small area of the office.	2 weeks taken to rescue paper documentation following flood in small area of office
Searchable Contact Details	Improved ability to search and for contact and team details on the intranet, eliminating the need for handwritten lists. At present, lists of contacts are handwritten in diaries and rewritten each year. (Users find them hard to find on the intranet as, although the intranet search facility does work, users seem unable to use it effectively, due to lack of training)	53.5 days spent searching for contact details on intranet

Benefit	Description of benefit	Baseline performance level <i>(Estimated days per year)</i>
Electronic Diaries	The ability to plan meetings, locate other team members and share this information without walking around looking for desk diaries (especially if answering a telephone enquiry requiring someone's location). An electronic team diary for important deadlines and meetings would make the knowledge easy to find. Site visit diary would allow car and visit sharing. (Electronic diary tools are available they are simply not used as users find them hard to use and have had no training.)	4.5 days spent collating desk diary details, typing into one document and printing. 8 days spent organising meetings
Team Sites	Ability to share and find information with other teams and within a team without the need to use/answer telephones and send the same information out several times due to no one being able to find it. Currently unable to find a document if someone who owns the document is away.	129 days spent answering the phone, sending out information and asking for information for mainly internal teams
Email	Improved ability to store emails and attachments connected to building permission applications and less time spent managing inboxes.	1270 days spent managing email documents
Improved customer service	Quicker response to customer calls and enquiries.	No figures available
Processing customer enquiries.	Reducing time processing applications, legal orders resolving network issues.	Planning application statistics provided to government.
Home working	Increased ability to work from home and access files without the need to carry paper files to and from home, which will improve document security	Activity not carried out at present
Reduction in physical storage space	At present large areas of floor space are taken up by filing systems. There are files in boxes and loose files located by desks on the floor posing potential health and safety hazards.	674.45 linear meters is the space presently taken up by filing systems in the office
Knowledge management (wikis, blogs and forums)	Ability to store knowledge learnt during projects or from those leaving, that can later be reused. (There is a reluctance to accept these types of tools have a use in the work place.)	Activity not carried out at present

Benefit	Description of benefit	Baseline performance level <i>(Estimated days per year)</i>
Improved ability to search intranet	The intranet is hard to navigate and locate information. No one can find what they are looking for so they find a contact and ask for it directly.	No figures available
RSS feeds	Users would benefit from having changes to policies informed to them rather having to accidentally notice a policy has been altered.	Activity not carried out at present

Table 4.3: Findings for disbenefits

Disbenefit	Description of Disbenefit	Baseline Performance Level <i>(Estimated days per year)</i>
Scanning	More time will be spent scanning documents that are received in paper format	No monitoring of scanning is undertaken at present
Reliability of system	If the system goes down no one will be able to work.	No baseline
Trust the system	Users need to trust that the system is reliable and up to date and that the latest versions of documents are available or paper will continue to be used	No baseline
Initial loss of productivity	Productivity will decrease while users adapt to the new system.	No baseline
Physical evidence	The Department retains physical evidence, such as house bricks, in order to be able to refer to the colour and shape of them when deciding on approving Planning applications. These will still need to be stored.	No baseline
Social networking tools	These are still viewed as having no place in the workplace as well as being distracting and time consuming	No baseline

Table 4.4 shows the issues and risks that were identified during the interviews. The risks were seen as problems that could prevent a successful implementation of SharePoint. The third column showed how likely an issue was to occur and the fourth column the impact the risk could have on the success of the project.

Table 4.4: Results of risk analysis

Risk identified	Description of risk	Likelihood (High, Medium, Low)	Impact (High, Medium, Low)
Culture	Ingrained working practices based on using paper are evident and changing these will prove to be hard. It will not be possible to force workers to stop using the paper method that they are accustomed to and comfortable with.	High	High
Business Processes	There is little evidence of any processes in place and they are not documented. These need to be put in place along with workflows, naming conventions, indexing and accountability for SharePoint to work effectively.	High	High
Training	Previous tool implementations have shown that a lack of training is given when a tool goes live, leading to limited up take of tools. SharePoint is going to require good training to be in place to ensure this does not occur again.	High	High
IT abilities	Users of the system have varying IT abilities with some users being unwilling to take on new skills.	Medium	Low
Help for users	Support is required to answer questions and queries that arise from day to day use. Potential use of 'champions' may help this.	Medium	Medium
Incentives for users	'My sites' and team details need to be kept up to date by users. During the marketing pitch, Microsoft suggested that incentives were required to encourage users to update their profiles.	Low	High

Risk identified	Description of risk	Likelihood (High, Medium, Low)	Impact (High, Medium, Low)
Ease of use	There is avoidance, at present, of using IT applications due to them not being user friendly. This could be combined with training issues as well.	High	High
Legal requirements	These will still require a certain amount of paper to be printed and stored	High	High
Management buy in and support	A lack of support from management will affect up take of SharePoint. If managers do not use the system others are unlikely to bother.	Medium	High
Compatibility of 'business as usual systems'	'Business as usual systems' need to be integrated into SharePoint. Users do not want more systems to log into nor do they want to be finding it hard to transfer data from one system to the next.	High	High
Email system	The email system is unable to support the business requirements that are currently required and SharePoint will increase the email usage. Sharepoint would provide less integration with the present system (Lotus Notes) than Outlook would, which would lead to restricted benefits.	High	High
Management of system	Security of the system and regular backups of files required.	High	High

4.10 Analysis of the Benefit Profiling Results

From Tables 4.2 and 4.3 it can be seen that there are many more benefits than 'disbenefits' for going ahead with the implementation of SharePoint, although Table 4.4 does show that there are several issues that need to be resolved for SharePoint to be successful. These issues and the high impact that they could have should have been investigated more thoroughly at the beginning of the project when they could have influenced the choice of tool. These issues are:

- Culture: paper vs. electronic

The Planning Services pilot group seem to use little in the way of IT solutions, sticking to traditional paper methods ranging from using desk diaries to pieces of paper on the wall to indicate the weekly whereabouts of the team (team members are required to leave the office to make site inspections) as well as having a very paper-based document management system. The diary scenario leads to difficulties in planning meetings as there is no way of easily finding out the availability of members for meetings without physically going around the office and looking at everyone's diary. At present there are electronic versions of calendars but no one uses them as they are seen as difficult to use, however, they have had no training and there are no incentives to use them as desk diaries are provided by the council. The planning services group feel that it is a large step to use electronic solutions to replace their paper base system, which they consider to be the norm, especially as the present paper base system works for them, though they agree that it is not perfect. They are very sceptical of relying totally on an IT system having had previous bad experiences with the previous council IT tools, such as systems not working or not being able to use them efficiently due to lack of knowledge.

The move from a highly paper based system to an electronic one will result in a change of culture. The employees are very set in their ways and sceptical of change, especially a change they see as being of little benefit to them. Changes in culture in any organisation are reported to be hard to deal with (Davenport et al, 1998; Du Plessis, 2008; Storey and Barnett, 2000). Preventing employees from continuing to use paper and not printing documents is challenging as it is difficult to remove the temptation of using the present, familiar system.

- The processes

The paper based document management system used at present is one problem that those interviewed in the pilot area all agreed needed sorting out. They are still reluctant to relinquish the paper but could see ways that electronic copies would potentially make a difference. The main concerns were the lack of processes in place and the lack of naming conventions across departments. Each department has a

different method of naming files, leading to duplication of files and being unable to find them again. SharePoint will need clear processes in place and an agreed naming convention for the system to work. This leads to the conclusion that addressing these issues would help alleviate the present system irrespective of whether SharePoint was implemented or not. SharePoint will not provide processes and will not provide a naming system. There are few known processes in place in the business, and even fewer are documented. Research by Wilkins, Swatman and Holt (2009) found that implementations of EDRMS systems were more successful if mapped to business processes.

- Training

A problem that was noted with present systems was the lack of training given when new systems and tools went live. The users felt this is the main reason why the current IT tools are avoided. An example of this is the electronic calendars that are available but are not used within Planning Services. The users will require training in order to utilise SharePoint (Herrera, 2008) or they will continue with their present practices. At present, users are left to their own devices in deciding how, where and when tools should be used which has led to them not being used at all. The tools already available are not seen as successful by the users or by management.

The various departments work in silos and the different departments have different approaches and abilities regarding the current IT tools. Enquiries of the other pilot areas showed that some departments are more willing to use IT tools than others but the same training issue is still present. The Planning Services team, in particular, lacks IT knowledge and, without training, will be unlikely to make full use of the new system. Research by Henriksen and Andersen (2008) and Maguire (2005) into adoption of EDRMS systems showed that training the users was a key area for successful uptake of the system.

- IT ability and reliability

There would also be doubts about the IT department's ability to implement and maintain such a system. If the system goes down, people will not be able to work as

they would become reliant on accessing the documents and information online. A disaster management program would need to be employed with a reliable backup procedure for files. There are also the issues of migrating the present documents and the integration of currently used databases. In just one department alone there were several key databases that would require integrating with SharePoint.

Some of the problems and issues that surfaced were not necessarily directly connected to introducing SharePoint but would need addressing to make full use of SharePoint, the main example being email. Email at the council is a huge problem and is shown in the results by the large amount of time employees spend trying to move and access emails and their attachments. A major issue within the department is the present email system. Outlook, the preferred email client for use with SharePoint, is not used at the council. SharePoint relies heavily on using an email system and, although will integrate with Lotus Notes, the currently used email system, it does not offer the same functionality. From the results of the benefit profiling, it can be seen that the present email system is already overloaded and causing time wasting issues. This could be resolved without the need to implement SharePoint simply by upgrading the email system. The main reason given for not using Outlook was the extra cost that would be incurred in running it.

- Cost

Although SharePoint will offer the document management system that is required, it also offers many more features to encourage knowledge sharing throughout the business. The cost of buying and implementing SharePoint and then not fully utilising it must be taken into consideration. The council seem to be making a large investment in a tool that would only be partially used.

- Organisational readiness

The readiness of the organisation to take on a system such as SharePoint needs to be questioned, and it must be asked if the Council is ready for knowledge management. The business processes are not in place, users are not prepared, capable or willing to accept a new system, and the IT abilities of the organisation are lacking. These are all

issues that need to be managed for successful implementation (McLeod and Hare 2005). This leads to the conclusion that the people, processes and IT ability of the organisation need to be taken into consideration when deciding on a knowledge management tool. Carrillo et al (2003) found that one of the key issues in successful implementation of a knowledge management tool was the readiness of an organisation, especially in relation to the potential users of the new systems.

4.11 Potential Success

Many of the above issues have been identified in the literature review (chapter two) as being potential causes of failure of knowledge management projects. Davenport et al (1998) identified eight factors that influenced the success of knowledge management tools, while Wong (2005) and Wong and Aspinall (2005) found eleven issues, many of which have arisen during the benefit profiling exercise. These include that people need to have the relevant skills to produce the best results and the motivation to use the system (Hahn and Subramani 2000; Bishop et al, 2008; Liebowitz, 2000), both shown to be lacking at the council. The systems need to be maintained and backed up which relates to the issues of reliability raised at the council. Cost is seen as a barrier to success (Davenport et al, 1998; Du Plessis, 2008) due to the high costs involved in implementing a tool and the difficulty in linking to economic performance. The benefit profiling exercise suggested some possible cost savings associated with the implementation but present performance is not measured in any way and this will lead to it being difficult to be able to justify any cost savings that are made after implementation. Financial return is recognised as one of the hardest indicators of success to be able to determine (Davenport et al, 1998). Culture is seen as the one of the biggest barriers to successful knowledge management initiatives (Davenport et al, 1998; Du Plessis, 2008) and is also noted as being one of the hardest things to change in an organisation (Storey & Barnett, 2000; Wilson, 2004).

None of the tools, ranging from electronic document management to people pages to electronic calendars, already used at the council are considered successful either by the users or by management. The users that were interviewed feel that they receive

no training, that tools simply appeared with no guidance and that they have no trust in these tools. The potential success of SharePoint has to appear doubtful at this stage of the project unless these issues are addressed.

4.12 Analysis of the Approach Taken by the Council

An analysis of the approach that has been taken by the council shows that there were several steps to their process. Figure 4.1 shows the steps that were identified.

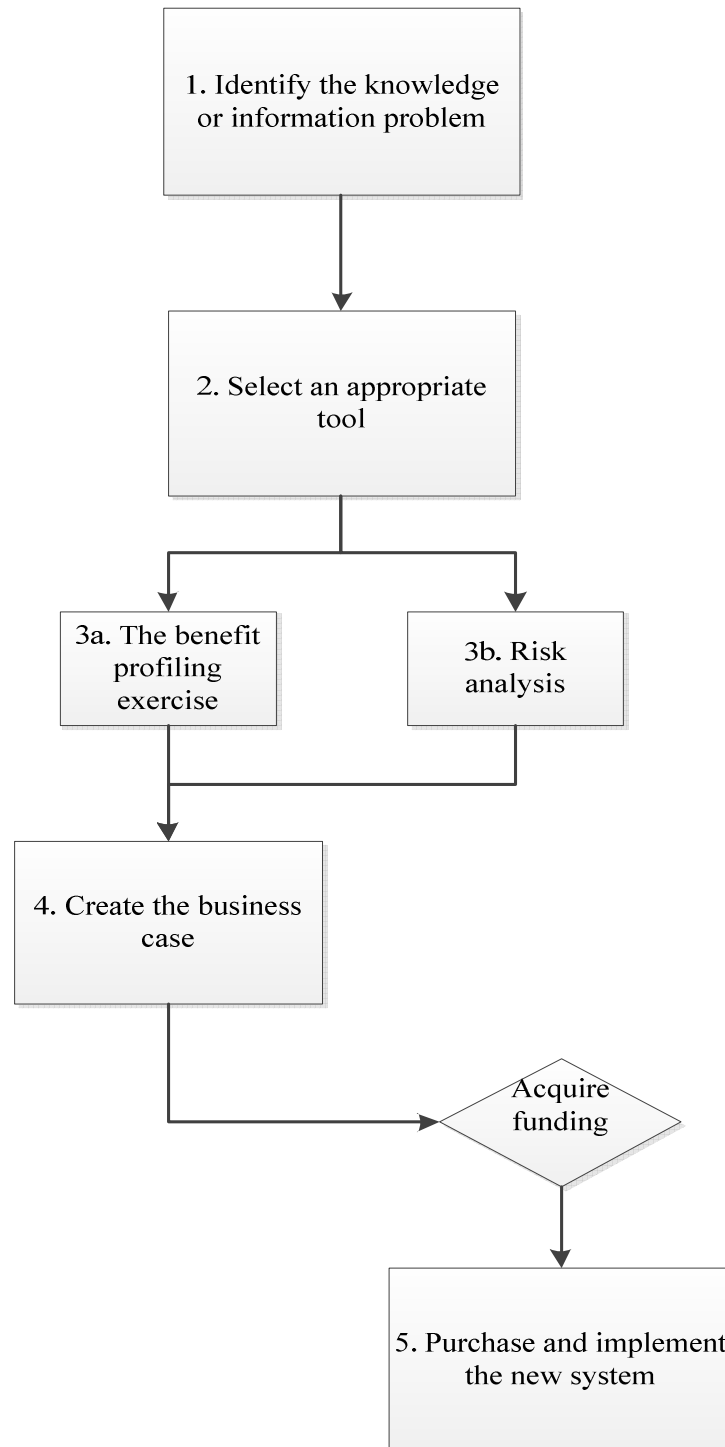


Figure 4.1: The selection process used by the county council

The above steps, however, were subject to inconsistencies and problems as follows:

1. Inconsistent scoping of the problem analysis

The initial analysis looked solely at the document issue as this was seen as the problem needing to be addressed. The knowledge management tool selected was based on the initially identified problem alone. No further analysis of knowledge problems or other issues that could affect a solution were considered in this selection. Other areas that the tool might contribute were sought after the tool had been selected, and were part of the focus of the benefit profile exercise. The effect of these on the project and how they could be addressed was not considered. This shows that the other problems found were used only to justify the use of the tool once it had been selected, rather than being part of the process to find the most appropriate tool. This could potentially lead to the tool later being used to resolve problems that are not even recognised as such by the employees or the business. Previous research by Dawson and Balafas (2008) showed that this approach is unlikely to be successful.

2. Alternative tools were not considered

The choice of knowledge management tool was not based on any analysis. It was made on the basis that the council was aware of document management software that could be used (according to its marketing) to address the problem. Other potential tools were not even considered.

3. Limited examination of alternatives for the tool selection

The limited number of tool providers that could be used, limited the tools that could be investigated. However, there was not even further investigation into the tools that were already used in the organisation to see if they could be improved to address the problem or used to solve some of the other problems found in the benefit profiling exercise. There was no systematic approach for deciding which tools could offer a solution to a problem and no way of assessing the issues that could affect the implementation of any tools.

4. The timing of the business case

The benefit profile was used to strengthen the business case to secure the funding for the project showing how SharePoint could be used within the department to streamline day to day business. It was hoped that the benefit profiles would show

where savings could be made in the long term by reducing staff numbers. As the timing and purpose of the business case was only to justify the tool selection, it was not and could not be used to obtain the best solution.

5. The invention of problems

To justify the selection of the SharePoint, the council looked for other problems the tool could solve in the benefits profiling exercise. However, many of the identified problems were not issues that the users felt were so significant they needed resolving. Dawson and Balafas (2008) found that starting from a recognised knowledge problem yielded a more successful outcome. In the case of the council, the invention of these other problems that were to be solved merely distorted the business case and distracted from the task of solving the problem originally identified.

6. Poorly defined methodology

The process of benefit profiling was not well set out. A form to fill in was provided, but there was no explanation of how to use it and no defined way of approaching this exercise. The profiling exercise was open to interpretation by each pilot area which, in turn, led to different and limited results being included. The form itself was badly designed with connected sections on different pages. For example, the performance levels were not completed by other pilot areas as there was no guidance given in how to complete this. The benefit table and the performance level associated with the benefit were actually in different tables with no way of associating one with the other. This made understanding the results hard difficult. The outcome was that different results were produced for each pilot area, preventing comparison of one area with the next and showing no clear way that the tool could be used across the whole organisation.

7. A lack of knowledge about possible tools and the tool selected

As the council used few knowledge or information management tools, there was little expertise on such tools in the organisation which meant, in the pilot areas where the benefit profiling and risk analysis was carried out, those involved did not know what

SharePoint or any possible alternatives could offer, so they could not effectively consider the benefits or risks for their department.

8. Incomplete analysis

The benchmarking of existing systems and the comparison of costings was only fully carried out in the Planning Department, largely because of the expertise and assistance of the University. This analysis was very patchy in the other pilot areas. Similarly, the risk analysis was only completed in the Planning Department and was largely ignored elsewhere. Even where the risk analysis was produced it was then not properly used for the business case. Indeed, the risk analysis appeared to be a tick in the box exercise to show something had been done as there was little attempt to make use of it.

9. No consideration of people and organisational culture

The process used by the council to select a knowledge management tool did not take into consideration the culture and the people that work in the organisation. Some existing tools were not being used as expected, but there was no understanding of why this was the case. This was taken as a reason for investing in new tools rather than being a source for investigation. Many of the employees at the council were used to working with paper documents and did not have an understanding of how electronic systems could or should be used, let alone envisage the process improvements that could result. Even without an in depth analysis, the University researcher involved could see that a lack of consistent naming conventions, a lack of ownership of online documents, a lack of trust in the tools to perform tasks as expected and a lack of training on how to use the tools contributed to the poor use of the existing tools.

10. A lack of defined business processes

The council could have looked at getting better processes in place to use the existing tools more effectively. An investigation of what the problems were with these tools would identify if the issues would also affect a new system being implemented. There are very few business processes in place in Planning Services, but SharePoint

will require business processes to be in place and will not magically solve these issues.

In summary, it was clear that the council had rushed into the decision to purchase SharePoint. They had clearly been influenced by the marketing of the tool. While SharePoint is undeniably a powerful and sophisticated tool, without the processes in place and the training of the workforce, it is clear that the council were not yet in a position to take advantage of the tool's capabilities.

4.13 Conclusions

SharePoint has the ability to provide the council with the EDRMS functionality that was originally required. The council, however, would only partially use the software, and even then, the benefits would only be seen if the council puts the processes and systems in place to take advantage of the tool's capabilities. Other alternative solutions may have been equally effective had these processes and systems been put in place, and indeed the existing tools used by the council may have been quite sufficient to solve the problems identified. The costs involved with purchasing SharePoint suggest that other solutions should have been further analysed before it was selected. SharePoint will meet the requirements of the business but it will be hard to implement, difficult to get staff using it and needs a change in the organisational culture. This leads to the conclusion that the council is not yet ready for such a big change and this could lead to an expensive result with only limited success.

The time spent at the council proved to be very revealing from the point of view of Loughborough University. The close involvement with the council enabled the council's processes to be identified and analysed thus meeting the objectives set out in section 4.3. The process used by the council for the benefit profiling exercise had not previously been documented and it was clear that it was not an optimal process. This process was somewhat haphazard in its execution leading to only superficial coverage of the benefits and risks by many of those involved. This provides

justification for a clearly set out process to select an appropriate tool to solve a knowledge problem.

A systematic way of analysing knowledge problems is required in order to find a suitable solution. The case study at the council has shown that the areas that need to be considered when selecting an appropriate tool include the problem requirements, all possible tools, the business processes, the risks and the capabilities of the people as well as the IT. This case study has provided a justification for a need to develop a methodology to select an appropriate knowledge management tool given a particular knowledge problem.

The systematic use of methods and tools would have enabled the council to select the most appropriate tool that would fit the problem rather than finding problems to fit the tool as the council ended up doing. The ability to understand how issues and risks could affect the choice of tools also needs to be analysed and then a tool should be chosen based on this analysis. A lack of analysis of the problems, solutions and alternatives will result in a high quality system that is underused, has high costs associated with it and does not provide a quality solution.

Chapter 5

Knowledge Management at AstraZeneca

5.1 Introduction

This chapter fulfils objective three from chapter one by investigating how knowledge management (KM) is approached in industry. The investigation carried out used interviews with knowledge workers in an organisation to establish which knowledge management tools are being used at the organisation and how successful the tools are considered to be. Further research was aimed at understanding how the tools are selected for use in the organization and how they are introduced into the working environment. Attention was also paid to the knowledge management strategy and if this influences the uptake of knowledge management tool. The organisation selected for this investigation into knowledge management practises was AstraZeneca.

The objectives of this chapter are, therefore, to discover:

- The knowledge management strategy at AstraZeneca
- What tools are available at AstraZeneca
- How tools are selected for use in AstraZeneca
- How tools are being introduced into the organisation
- Which tools are successful and which tools fail
- If tools are being managed or if they are left to run themselves
- Any relationships between how tools are introduced and if they are successful or if they are managed and successful
- If AstraZeneca has a systematic approach to selecting and managing knowledge management tools

AstraZeneca is a global biopharmaceutical company. They discover, develop, manufacture and market prescriptive medicines for six important areas of healthcare including illnesses such as cancer. AstraZeneca employ approximately 61000 people

in over a hundred countries. A large part of their investment focuses on the Research and Development (R&D) area of the business with around 16000 employees at fourteen major sites in eight countries (AstraZeneca, 2011). R&D is at the core of the business and focuses on delivering new medicines in their six key healthcare areas.

5.2 The Information Gathering Process

To establish knowledge management practices at AstraZeneca and to fulfil the objectives set, a series of interviews were undertaken with staff at the company. These interviews were conducted within the Research and Development area of the organisation. The Research and Development facilities at AstraZeneca are located across eight counties and with several locations within a country. Those people who agreed to be interviewed were located in Sweden and the USA as well as the UK. Although this would give an international view of knowledge management across the company with the potential to take into account any cultural differences, this posed a problem for carrying out interviews. It was decided, therefore, that telephone interviews would be the best method to use in this case, with the possibility of doing any follow up work required using either email or further telephone conversations.

Seven telephone interviews were conducted. The interviewees were located in three countries; one was based in the US, three in the UK and three in Sweden. A list of questions (Appendix C) was prepared and sent out before the interviews were arranged so that the interviewees had an idea of the questions and areas of interest in advance. The interviews themselves were semi structured using the questions as a starting point but then concentrating on the interviewees' main area of interest on the subject of knowledge management. Some of the interviewees were actively involved in the decision making processes behind the knowledge management tools used in the organisation, others were implementing KM initiatives in their area, some were end users of the knowledge management tools and others had a strong interest in the subject of knowledge management and had had some involvement in past knowledge management initiatives. The main areas that were investigated in all the interviews were which tools are or have been used, the reasoning behind the tools usage, the user's personal opinion of using the tool and the success rate of tools. In the later

interviews the questions asked altered, influenced by the knowledge learnt from the previous interviews and the gaps created by these interviews that require answering. This ensured that the seven interviews did not just repeat the same answers but that other views of specific areas of interest were gained.

5.3 Analysis of the Interviews

The seven interviews were conducted with the results of these interviews being available in the tables in appendix D. The interviews were analysed in order to fulfil the objectives set out in section 5.1. A total of nine tools were mentioned during the interviews. They are:

1. Wiki
2. Yammer
3. Tool with no name (the tool had not been named by those involved with its development)
4. Company Intranet
5. Knowledge networks
6. Library on legs
7. SharePoint
8. Epistine
9. Document management tools

5.3.1 Knowledge Management Strategy at AstraZeneca

From the interviews it can be concluded that AstraZeneca has not had a knowledge management strategy in the past. It appears that all their resources were poured into their core business of drug research and development so intently, that the organisation did not appreciate the importance or the potential of the IT and knowledge management side of the business. Individuals and small groups of workers within the organisation did recognise the potential of using knowledge management tools but the attempts by them to introduce tools into the workplace met with only limited success and no management backing. It was felt by those involved in introducing knowledge management initiatives at a local level, that the lack of

management support and the culture of the organisation were the main reasons for failure. Both of these issues are seen as barriers to successful knowledge management (Davenport et al, 1998; Du Plessis, 2008). Management support is not exclusively aimed at senior management but includes middle management and the knowledge workers as well. The interviews at AstraZeneca show that support for knowledge management initiatives needs to come from all levels in the organisation in order to be successful and that just having the workers prepared to share knowledge does not lead in this case to a successful outcome.

In 1992 one of those interviewed worked within an area that began to realise the gains that could be made from sharing knowledge. The organisation, however, was not prepared at the time to move forward and take on sharing knowledge. There were two reasons given for this in interview 4 that were mentioned again in both interviews 3 and 7:

1. Protect what you know. This was seen more as a political reason, keeping data for yourself to strengthen your own position. The ‘knowledge is power’ syndrome
2. The business did not understand the use that could be made of IT in helping to share Knowledge or the value of sharing knowledge.

Both the above have been mentioned in the literature as potential barriers to successful knowledge management (Dawson and Richardson, 2007; Bishop et al, 2008). There are documented issues relating to motivating and rewarding staff to share their knowledge. Staff need to recognise the value of knowledge management (Bishop et al, 2008) and organisations need to be able to encourage staff to participate in knowledge management initiatives. Suggestions for motivating staff have ranged from financial rewards to peer recognition (Bishop et al, 2008; Liebowitz, 2000). The ‘knowledge is power’ syndrome mentioned during the interviews has been associated by Walsham (1993) to be connected with organisational politics and unwillingness by workers to surrender their knowledge for fear of losing their status and importance within the organisation.

Employees consider themselves to be behind in the development and use of IT in the organisation. Chua and Lam (2005) recognised that a lack of IT skills by the organisation and its workers can be a barrier to success as many knowledge management initiatives include technology. Technology is beginning to be used and appreciated in AstraZeneca, as are the benefits that could be gained by sharing knowledge across the organisation, shown by the introduction of the new initiatives mentioned in interview 7.

Among those interviewed it was felt that there is a move in culture from 'I alone' to 'we together' and that this will encourage greater knowledge sharing. Culture is seen by Storey and Barnett (2000), Du Plessis (2008) and Davenport et al (1998) as one of the main barriers to successful implementation of knowledge management solutions and one of the hardest to overcome (Wilson, 2004). There appears to be a move by the company to accept that knowledge management should be invested in, with projects such as 'learning from experience' being part of a strategy refresh that is taking place but this is only just starting.

From the interviews it can be concluded that there are many recognised barriers to successful knowledge management at AstraZeneca and that there has been no clear strategy in the past but that this now appears to be changing. The business strategy at AstraZeneca is changing to include investments in new infrastructure including 'informatics platforms' (AstraZeneca, 211).

5.3.2 Wiki

This tool went live towards the end of 2009 and, at the time the interviews were conducted, it was still seen as a new tool. It is available across the whole organisation though it is only used in pockets with the interviewees in UK not using it at all but both Sweden and the US using it.

Selection method

This tool was originally introduced to solve a problem for a particular group (pharmaceutical area based in Lund in Sweden) who have continued to use the tool.

They wanted a way of sharing knowledge across their area of the business that could be used to refer to when required. Following the successful pilot for this team the tool was distributed to the whole of AstraZeneca where the uptake of the tool has been limited. The interviews showed that there were two different viewpoints on the introduction and understanding of the tool.

The management view shows that the tool was introduced to solve a knowledge problem and there was a clear strategy in place behind the usage and promotion of the tool. The guiding principles that management developed were:

- Users are responsible for contributing knowledge and had the power to make changes to entries. The contents of the tool are not managed centrally but that the contents are up to the individual.
- Champions. These are used to promote the tool. The champions receive training on how the tool can be used and then they passed their knowledge of the tool on to other users.
- It is available and readable by everyone at AstraZeneca.
- The tool has management backing without which two of those interviewed felt that the tool would not have been as successful as it had been so far.

The users' view of the tool is different from that of the management. The interviewees from both the US and the UK deem that the wiki tool has appeared silently when a change of platform occurred, with no promotion or use of champions. The change of platform was a move from using Microsoft XP to Microsoft Vista. There were no strategies or guidelines issued by management that the interviewees could recall when the change took place. In the US the tool is used but knowledge of the tool has occurred by word of mouth. The interviewees from the UK do not use the tool although they do know that it is available. The management buy-in for the tool and the promotion of the tool seems to be based in Sweden alone, as there is no evidence to suggest that the users in either the US or the UK are aware of any promotional activities.

5.3.3 Yammer

This tool was described by those interviewed as an internal twitter like tool as well as having a similar feel to Facebook. The tool is described by its providers (Yammer, 2010) as ‘an enterprise social network’. It is seen as a secure internal corporate communication tool that allows all employees of an organisation to communicate within various groups, share files, blogs and direct messaging.

Selection method

This tool was originally introduced into AstraZeneca bottom up. It is not considered an official tool and is not recognised or its use rewarded in any way by management. There were no reasons given for the appearance of the tool or any guidelines on how it should or could be used, however, the tool does seem to have been rolled out across the organisation with everyone interviewed having access to it. Yammer gets used as people see fit. It is seen as a relatively new tool to the company.

Usage

The way in which Yammer is used is not monitored nor is there any guidelines issued for the use of this tool. There is no training given and it is left up to the users to decide on the subject matter for the groups and topics that are created. A group is limited to small number of active members though they can have a large numbers of followers and members that are not actively participating. The users that were interviewed have not noticed any advertising of the tool and there are no senior leaders actively encouraging promotions or use of the tool. Yammer appears to have been noticed, in many cases, by word of mouth or a need to find information and been told to look on Yammer for a potential solution.

Yammer was mentioned by all the interviewees, showing that everyone had at least heard of the tool. It was found, however, that no one used the tool on a regular basis or necessarily contributed to it. All of those interviewed did follow discussions and belong to some of the groups that they thought would be interesting. It appears to be

used more widely in the US and Sweden with those interviewed in the UK not using it at all though again they have followed some of the groups and discussions.

One user in the UK had looked at it but found very few topics under discussion of interest or of use, an example of this as a very general discussion on 'project failure'. They felt that a more specific question or answer to a problem would be of more benefit to users such as a query from a unit in Mexico looking for specific help on an innovation project that they were running.

Another example of how Yammer is being utilised was the use made of the tool as a help desk. This scenario was mentioned by two of the interviewees both of whom are based in Sweden. As part of a change to the IT platform, the IT helpdesk in Sweden had been outsourced. Before the change it was possible for the interviewees to go down the corridor and ask for help with IT issues. Users knew who to ask and they could get an immediate response to their enquiries. This system has been changed to using phone calls, getting a ticket and due to the large number of calls inundating the help desk, due to the change in platform taking place at the same time, three weeks later the issue raised would be addressed. The help desk could not always solve the issue. Yammer was used as a 'cry for help'. The interviewees discovered that by posting the problem on Yammer that the problem had already been resolved by another user and a solution could be found sometimes within the hour but always within that day. This becomes a more efficient way of solving the problem but also an unplanned and innovative way of using a tool such as Yammer. This suggests that this tool could be used to share knowledge during a change activity. This was highlighted by its use as a help desk and Yammer could be utilised as part of change management, giving users an area to get answers from following a change, especially one involving large numbers of people over several sites. During the interviews this was mentioned as being a possible use but not one that is consciously done at present.

Comments from the interviewees found that, if it was an interesting topic, then a lively discussion would ensue, but only those with an interest would take part. It was noted that the same people tended to actively take part in discussions and that there were many people who followed a group but rarely, if ever, contributed to a

discussion. AstraZeneca has over 60000 employees in over one hundred countries worldwide but Yammer groups tend to have only a hundred or so members, if that, which is only a small proportion of the potential users. This could be due to interest of a particular group attracting a limited number of users or that users are not interested or motivated to use the tool. The usage of Yammer is not measured in any way, so it is not possible to gauge the uptake of the tool across all the potential users.

The users that do get involved and use Yammer could be categorised as:

- Those who treat a new tool like playing with a new toy. The user discovers what the tool has to offer but this does not mean that they will continue to use it
- Those who are more innovative and take part in discussions
- Those who are comfortable with using it
- Those that understand or get some benefit out of it

The reasons given for potential users not getting involved were:

- Discussions of no interest
- Users just seeing the risks of using it
- Feeling that they have nothing to offer that anybody may want to know
- Users being unwilling to share their knowledge

There were some areas of the organisation that seem to be using the tool for more specific purposes and are more actively using Yammer. These include:

- IS, based in Sweden, is very actively using it.
- Medical innovation group have an active group
- Commercial group in US use it to manage their commercial business activities.

AstraZeneca is a global organisation and there are differences in the amount a tool is used between the countries. Sweden has more active groups and seems more prepared to share knowledge. The US uses it in part but is less open with the knowledge that they are willing to share and the UK does not appear to use Yammer. This could be due to the cultural differences between the countries and in the case of

the UK this could be related the recent media reports that suggest social media tools have no place in the work place.

5.3.4 Tool with No Name

This tool has been developed to meet the needs of sharing knowledge within a specific group based at Alderney Park in the UK. The tool has not been named by the group involved in developing and using it. The group involved with the development of the tool and they are the only people using the tool comprise of 175 permanent plus some temporary members of staff. There are 4500 people based at Alderney Park where this group is and, therefore, it is used by a small group compared to the size of the base and the organisation. Only interviewee 5 had been involved with the development of this tool.

The group that are involved with this tool are again part of research and development area of the organisation. The group aim to research and deliver new drugs including testing of these drugs. This team is comprised of different therapy areas, such as an oncology area, and the tool was developed in order to help the staff share knowledge and information across these different therapy areas. Although the different therapy areas are investigating different drugs it was felt that there was sufficient overlap in knowledge that lessons could be learn from different projects and reapplied to future projects.

The tool was described by the interviewee as ‘spreadsheet-like’ with searchable categories. It is not based on any specific application or product. It is not seen as a high tech tool but uses basic technology with strong processes and management in place to ensure its success. The tool is new having gone live in 2010.

Selection method

Before this tool was introduced there was a storage area for lessons learnt and other documents but it was not searchable. This led to lessons learnt not being reused, as users could not find what they were looking for. The same issues and the same loops

were carried out throughout different projects again and again leading to a waste of resources and especially a waste of time.

The group recognised that the system in place did not deliver the results that were required and that a problem with the capture and reuse of knowledge existed. This 'knowledge problem' was used as the starting point for finding a tool that would help solve the problem.

A customer survey was conducted by AstraZeneca to find the main issues with the current system in order to clarify the problem from the users' perspective. The issues highlighted were:

- Time consuming to use and enter data
- Not searchable and could never find anything
- Not sure where to put information
- Information was not reviewed
- Documents were not up to date

From this survey the main criteria for the tool with no name were deduced. The new system must be:

- searchable
- easy for the user to use
- contents need to be reviewed in order to keep them up to date
- quick to enter data
- able to find contact details

Although the tool was important, the people using it are the primary concern and the tool is seen as an enabler. The idea that the people side was the important part, not the technology, was stressed throughout the development of the tool which differs considerably from the other tools that are present in AstraZeneca. This led to a tool that is strongly driven by processes and highly managed which is a very different approach to the other tools at AstraZeneca.

The tool was selected by searching within the company to see what was available and already in use. This was a global search (US, UK, Sweden). The tool was found in Sweden but has been changed considerably to get it to work in the UK efficiently and to meet the needs of the users. Although this shows a limited search for a tool, by keeping within the organisation, the tool was developed to meet the needs of the users and the knowledge problem rather than the approach taken by Nottinghamshire County Council in the previous chapter who found problems to fit the tool.

Processes

Processes have been put in place to make the tool work and it is highly process driven. The tool is accessed through the intranet. Feedback from users, however, suggested that they could not find the tool on the intranet due to the intranet being hard to navigate and with poor search facilities. In keeping with the philosophy of making the tool as easy as possible for the user to use, an icon was installed on the users' desktops eliminating the need for searching the intranet.

The desktop icon can be used to submit knowledge in the form of feedback and lessons learnt from projects. Clicking on the icon provides links to the forms that require completing and then submitted to a Knowledge Management mailbox. Having received the forms, the tool is updated by one person, who is part of an admin team, with the necessary information from the submitted form. Links are used to access documents from the tool and the documents are placed in set storage areas. These storage areas do have search facilities that can be accessed independently of the tool but the links from the tool offer a quicker and more efficient method of locating the relevant information. Originally 'e-rooms' were used to store documents but these are not accessible on a global level and the storage of documents has been moved to DKP which allow the use of the tool to be expanded in the future. (DKP is a storage area that anyone within the organisation can access whereas e-rooms offer local access only). Forms and links to relevant documents are used to minimise the amount of work carried out by the person submitting information to be included in the tool.

The processes that have been put in place are aimed at giving the user the least possible amount of work to do in order to submit entries to the tool, making it both an easy and quick process. With the continual feedback from users, the tool is regularly updated and any problems tackled to keep users happy. The tool itself uses only basic technology and relies on the strong management of it to make it successful.

Lessons learnt from the projects that take place within the group are also recorded here. Projects have Key Performance Indicators (KPIs) and the lessons learnt are used to understand what has gone both right and wrong with a project in order to better meet the KPIs that are set. This is expected to lead to project improvement though this is not measured. Facilitators are used to collect information at specific time points in a project. These facilitators are external to a project and are provided with a template to fill in. A facilitator's task is to find:

- 3 wins: successes or methods used in a project that were seen as successful
- 3 walls (blockers): unsuccessful method or problems encountered in a project
- 3 wisdom: pieces of advice that the team feel should be passed on

The template is sent to the knowledge management mailbox and the details uploaded into the tool.

A facilitator will then proactively use the knowledge that has been gathered to provide help with other similar projects. This is a highly labour intensive task for the facilitator and relies on the ability of a facilitator to recognise and understand project information.

There are knowledge owners/experts who are responsible for their set categories. A category example is 'protocols'. The categories are reviewed every six months by the expert owner. It is possible to see the latest entries to a category and who entered them. The trail of who submitted them allows people to contact that person.

Promotion and usage

Compared to the other tools at AstraZeneca this tool is actively promoted, which differs from the other tools used at AstraZeneca. Promotion is carried out in several ways. The knowledge owners go out into the teams and champions are also used. Other types of promotion include a presence at open days, posters, knowledge sharing web pages, an icon on desktops, and an intranet presence.

There are several user groups that have been identified that access different areas of knowledge in the tool. Administration staff tends to use the hints and tips areas. Lessons learnt tend to be used by the project teams. Three main user groups have been recorded:

1. Looking for training, help
2. Leaders highlighting issues
3. Project leaders using knowledge from across different projects to solve problems

This tool has had a very different approach to knowledge sharing than the other tools at AstraZeneca. It is heavily managed, relies on processes being followed, uses promotion and its usage is monitored. The tool is not used companywide, unlike the other tools, and is deemed successful so far though no users of the tool have been interviewed.

5.3.5 Others Tools

Although other tools were mentioned those investigated above appear to be the most used and were mentioned by all those interviewed. Other tools that were mentioned included:

- Knowledge networks: These are Communities of Practices (COP) that were started in January 2010. They are knowledge sharing communities across the whole of AstraZeneca and meet regularly, face to face. They are aimed at local colleagues and have a variety of groups, such as the Informatics group. Four of

the seven interviews mentioned knowledge networks with all four being part of a group and taking an active role at some stage.

- Company Intranet: There are some problems reported on finding items on this site. The two areas that are the most often used based on the number of visits, are the skills database and links database.
- Library on legs: This was seen as a failure. It was a list of experts with contact details and subject. The acronym (LoL) was thought to have put users off but no monitoring of the tool was undertaken so the reason for failure is vague.
- SharePoint: The introduction of SharePoint is being investigated at present although those interviewed seemed to have reservations about the need for this tool and the difference it would make to the workplace.
- Epistine: Decision making tool that was developed but never went live due to the high costs associated with it.
- Document management: Several document management solutions were mentioned throughout the interviews. 'E-rooms' and DKP.

5.4 Analysis of Findings

Selection

There is no apparent systematic way that tools are selected and introduced into the organisation. The wiki was initially selected to solve a specific problem within a particular group of users. It appears to have been successful in solving this problem but was then rolled out across the whole organisation with only patchy success. Yammer has also only received patchy success. It was suggested by Dawson and Balafas (2008) that knowledge management tools were more likely to be successful if they were introduced to solve a problem. This is reflected in the use of the tools at AstraZeneca and the patchy uptake shows that the tools are used if there is a perceived need by the users.

There are two main ways in which tools are introduced into the organisation.

1. Bottom up: tools such as Yammer are used by individuals and are not initially recognised by management. The tool is found to be useful by the user who encourages others to use it. The tool gets promoted by word of mouth.
2. Top down: Tools such as Wikis are introduced by management into the organisation. They are rolled across the whole organisation and expected to be used by everyone.

There is no systematic way to evaluate and select tools at AstraZeneca.

Success

No-one interviewed claimed that any one tool was successful and, with the exception of one (Libraries on legs), none was claimed to be a failure either. The best response was that a tool was 'useful' and that the tools in question had not been around long enough to be classed as successful or not. Reasons for the lack of failures included tools that were seen as not performing as expected but were simply further developed or changed into another tool. It was also discovered that measuring and monitoring of tools was not undertaken. Some tools simply became obsolete due to advances in technology and changes in business needs as seen with 'Our Discovery' which was overtaken by the Portal. If tools are not measured or monitored in any way it would be hard to classify a tool as being either successful or a failure and from the businesses point of view it would be hard to evaluate the rate of return on the investment. The 'Tool with No Name' shows that by monitoring a tool and having management involvement does ensure that a tool is used and more likely to succeed than a tool that is not.

Tool Usage

With the exception of the tool with no name, the tools are available to everyone in the organisation. In the case of Yammer this raises the question that if the tool is introduced bottom up at some point, management must have known about the tool and agreed its distribution across the organisation.

Tools are only used if users have a need for that tool or sometimes an interest in the tool. A tool introduced to solve a specific problem does appear to get used (as shown by Wiki that was introduced for a specific problem in a specific area and is used by that area). A general roll out of a tool because 'it will be good for knowledge sharing' is not as effective. The uptake of a tool is shown to be patchy when rolled out to everyone.

Yammer and the wiki are not used in the UK but are used in Sweden and the US. UK users interviewed did follow discussions initially when the tool was new but did not contribute or participate further. There is the possibility that this could be due to cultural differences.

Tool Promotion

Users considered tools such as Yammer and Wiki to have just appeared silently when a new platform was introduced in the organisation. No training or help in using the tools was offered and no promotion took place. This applied to other tools mentioned in the interviews as well and no user mentioned the use of champions. The champions and guidance that management discussed in interview 3 has not filtered down to the users. The only tool that is actively promoted was the tool with no name. In the case of wikis the promotional style of using champions has not been effective.

Selection vs Success

There is no distinct link between the way in which a tool is introduced into the organisation and the success of that tool. This is due primarily to tool performance not being measured in any way, making it hard to qualify if a tool is in fact successful. Tools introduced bottom up do appear to be used as much as those that have been introduced in a top down method. Tools that are introduced for a specific problem and for a smaller group of users do get used. If success is based on the tool being used then tools that are introduced for a specific knowledge problem and for a specific group of people are showing a more successful outcome.

Top down vs bottom up

The interviews at AstraZeneca have shown that KM tools have been introduced into the organisation both top down and bottom up. Top down refers to tools that are decided upon at management level. The tools are then passed down to the lower levels. The advantages of this include better control of the tool in question with the potential to offer training and guidance on how to use the tool. The disadvantages are a lack of innovation in using the tools and a lack of motivation to use the tool as users feel it is another extra task to do.

Bottom up tools are introduced by the users at lower level with the potential for the tools to make their way up to the managers. The use of the tools is spread by word of mouth from one user to the next, as they find the tool useful. The advantages of tools being introduced this way is that users are more motivated to use them as they tend to acknowledge the need for using the tool and there is a more innovative use of the tool. The disadvantages are a lack of control of the tool by management and the potential security issues involved. The content of tools would not be monitored as well as the security issues associated with users downloading software onto work machines.

At AstraZeneca, Yammer was introduced bottom up and Wiki top down. Both the tools seem to have patchy uptake and are used as and when users feel they need to. Although Wiki has management backing and some controls in how it is used have been put in place, these controls do not seem to have filtered their way down to the users (Section 5.3.2). Yammer has taken off without management backing and a more innovative use of the tool has been shown when the tool was used as a helpdesk (Section 5.3.3). These results suggest that management backing is not always necessary for a tool to be used even though the literature review in chapter 2 suggests that a tool would fail without it (Du Plessis 2002, Chua and Lam 2005). It is hard to gauge how successful a tool is in either case, as the tools are not monitored in any way. The main conclusion from these two tools is that tools are used if the user perceives a need to use them. The Tool with No Name has management backing and is perceived as being successful so far, though the Library on Legs tool also had management backing and failed. In conclusion, management backing does not

guarantee a successful outcome though it does aid the uptake of a tool as shown by Wiki being more widely used in Sweden (section 3.5.2). Tools are more likely to be used if the user perceives a need to use the tool or it is part of a business process as shown by the use of the document management systems that are used at AstraZeneca.

5.5 Conclusion

The investigation into the tools at AstraZeneca has shown the different approaches taken to introducing knowledge management tools and solving knowledge problems in an organisation. Tools that were introduced to solve a specific knowledge problem for a specific, smaller group of users does lead to the tool being used more regularly and successfully by those it was intended for. Users do not use tools unless they see a need for using them other than a possible initial interest in the tool when users treat the tool as ‘playing with a new toy’. If, however, users are given a free rein in how a tool could be used, then some innovative uses can be made of these tools as shown by using Yammer as a ‘helpdesk’. The research has shown that introducing tools across an organisation without strong management support and clear promotion can lead to the uptake of a tool being patchy and the user’s view of the tools can differ from those originally intended. The lack of measuring or monitoring of tools once they have gone live has resulted in AstraZeneca being unable to ascertain whether the tools are successful and worth pursuing.

This investigation has shown that AstraZeneca has no systematic approach in selecting knowledge management tools, though using a knowledge problem as the starting point is giving better results for the problem owners. It was noted that the tools considered to solve a knowledge problem appear limited with no alternatives identified. There is a lack of consideration for the user’s needs, with training and promotion of a tool only happening with one of the tools mentioned at AstraZeneca. There is no consideration for any barriers or risks that could be involved when implementing a knowledge tool. This case study has shown the need for a systematic approach to selecting a knowledge management tool that takes into consideration

these issues before a tool is selected and being used by the organisation in order to ensure a more successful result.

CHAPTER 6

CLASSIFICATION AND SELECTION OF TOOLS FOR QUALITY KNOWLEDGE MANAGEMENT

6.1 Introduction

The case study at Nottinghamshire County Council and the interviews carried out at AstraZeneca both show that there is a need for a systematic approach to selecting a knowledge management tool. Knowledge management tools are being introduced into these organisations in a variety of ways and in a haphazard manner that are not proving to be particularly successful. In order to meet objective four from chapter one, a tool or selection of tools will be suggested that will enable a manager to select an appropriate tool given a knowledge problem.

This chapter proposes two tools that will aid the business manager in finding a knowledge management solution for an identified problem that can be adapted to any particular context. These tools can then be the basis of a systematic methodology to find a suitable knowledge management tool giving a quality solution in the context of the problem.

The tool would need to be simple to use, such that managers in many different disciplines could use it, and flexible such that they could use the tool on a wide variety of problems. For this purpose it was decided to examine potential diagrammatic tools that could be implemented on a drawing package or spreadsheet as these are familiar basic technologies that managers use.

6.2 The Starting Point for the Tool Development

A spreadsheet solution was examined but it was found that, in order to accommodate all the information required, the solution stretched over several pages making it hard for the manager to be able to both manipulate and visualise the results.

The 'House of Quality Matrix' is part of Quality Function Deployment (QFD Online, 2007), a technique for aiding managers in decision making when choosing product options. This matrix was originally designed to investigate a single product but to take into account the many different influences on the manufacturing of the product, especially the customer's view of the product. The end result is to recommend the choice of a product that balances the various influences and highlights the degree of difficulty in resolving some of the issues, some of which may not have previously been considered. The same approach could be applied to choosing a knowledge management tool to solve a knowledge problem, by investigating all areas that may affect the successful implementation of the tool. This gives the manager the opportunity to take any mitigating action against them.

The House of Quality Matrix is designed on a spreadsheet and, due to its compact nature, it is possible to fit it onto one page, making it easier for managers to visualise the problem and results. In order to achieve this, the house is divided into six different areas. Some of these areas can be filled in independently, without reference to the complete matrix and then the results transferred to the main grid. The six different areas represent the different influences that affect the final product (figure 6.1). They are:

- Left Hand Extension: The customer requirements are placed here to represent what the customer wants from the product.
- The planning matrix: This represents the competitors' products from the customers view and is positioned in an extension on the right hand side of the house.

- Technical requirements: The ‘How’ section shows how the product will meet the customers’ needs and is positioned in the top floor of the house.
- Inter-relationships: This is the middle area of the grid, the main body of the house, and shows how well the product meets the customer’s needs.
- Conflicts: This focuses on the conflict between the technical requirements and is in the roof of the house.
- Targets: This area gives the results of the planning matrix and is situated in the basement.

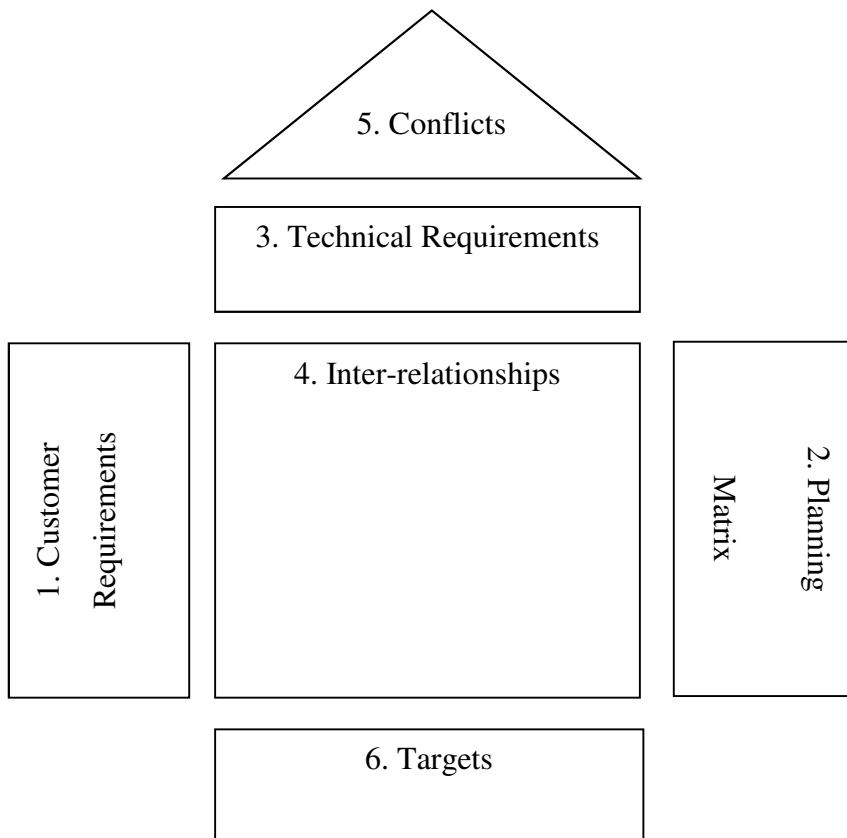


Figure 6.1: House of Quality

Filling in the House of Quality matrix can take a lot of time (Logan and Radcliffe, 2007) and can come across as quite complicated when working out the weightings.

These are two obstacles to overcome when transforming this into a useful knowledge management tool.

It is proposed that the tool for Knowledge Management, to be called the 'House of Knowledge Management Tool Selection' (HoKMTS) should be based on the House of Quality. A knowledge management solution requires tailoring the areas of the house to suit the needs of solving the knowledge problem. These sections will allow the manager to see the many aspects of implementing a solution that may otherwise have been overlooked and see how they may affect the knowledge management tools the manager could employ to solve the problem. All the possible tools and techniques that the manager is considering will be accommodated as part of the grid. As the HoKMTS is designed on a spreadsheet format it will be possible to run 'what if' scenarios as well as being able to show results as graphs.

6.3 The House of Knowledge Management Tool Selection

To implement the new house it is necessary to identify the areas that are required to solve the knowledge problem. Then, they can be incorporated into the house. The previous two chapters have helped identify these areas. They are:

- The knowledge problem
- Knowledge tool or technique
- Barriers to success

In order to find the successful knowledge management solution the problem itself needs to be broken down into separate components. These components need to focus on the knowledge management processes that will occur as well as considering any business drivers that are seen as critical. The problem requirements are in one section of the house. The tools and knowledge management techniques that are being considered to solve the problem will also need their own section in the house. The house needs to offer the manager the ability to view all the tools being considered in

one section of the house so that it is easy to compare the results of all of the tools. The relationships between the tools and the problems and a results area will be required by the manager and this will occupy a third section of the house. Investigation into knowledge management initiatives and the case study at Nottinghamshire County Council has shown that there are a number of barriers to successful implementation of solutions that are specific to knowledge management (Du Plessis 2008) and as such a barriers section will be used to represent these and show their effects on the tools. A final section of the house is one that can show if tools could be used together to give a more complete solution to the problem.

The areas of the House of Quality will be used in the HoKMTS as follows:

- The left hand extension will become the problem requirement section. This area will hold the breakdown of the knowledge problem being dealt with.
- The right hand section that held the planning matrix is not being incorporated into the HoKMTS at present.
- The top floor will become the knowledge tool or technique area. This will host the list of possible tools that could be used to solve the knowledge management problem.
- The main body of the house will give the relationships between the tools and the problems and totals of the weightings. This is the main output section of the house
- The roof area remains and is used to show the connections between the tools, showing which can be used together.
- The basement area becomes the barrier basement showing the effect of the barriers on each proposed tool.

Figure 6.2 shows the position of the different areas. Starting from the bottom, there are the barriers, the section above holds the inter-relationships between the tools and the problems as well as the results section with the tools above that. The annex on the left hosts the problem requirements and the roof is the multiple tool selection space.

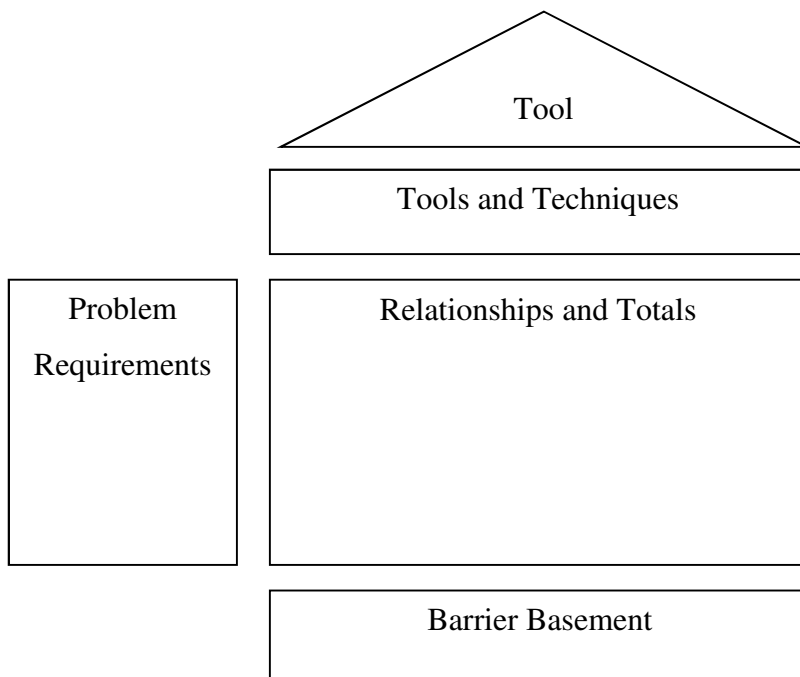


Figure 6.2: The House of Knowledge Management Tool Selection.

6.3.1 Problem Requirements Area (house extension)

The problem is broken down to look at specific features that would be associated with a knowledge management problem. The headings in this section would remain the same for all problems that would be looked at, making them permanent features of the house. This would lead to the managers being able to systematically evaluate all problems in terms of recognised features of knowledge management. Keeping the headings the same also ensures that managers will look thoroughly at the entire problem and not just the obvious, ensuring that better solutions are reached.

The different parts of the problem requirements are then rated to show how important they are in relation to solving the problem. A rating scale from 0 to 5 is used to rate this. 0 represents that the problem being solved does not contain this type of knowledge problem, while 5 suggests that it is a main part of the problem. This scale was selected as it was found to be easy to handle and gives a sufficient number of levels to distinguish cases. Indeed, in practice many of the values here will be 0 or 5

indicating that these aspects of knowledge management are either not relevant or completely relevant. It is also apparent that some of the problem breakdowns when rated will actually have an adverse overall effect on the problem. Thus for a section of the problem on 'cost' a score of 0 for a tool would imply low cost and a score of 5 would imply high cost for that tool. This demonstrates that some of the problem breakdowns will have a positive effect on the overall success of that solution while other parts of the problem breakdown, using this scaling method, will have a negative effect on the success of the solution.

6.3.2 Technique or Tool Area (top floor of the house)

The technique and tool section represents the knowledge management solutions that are being investigated and can be broken down into IT tools and those solutions that are non IT. The number of tools shown in the grid would depend on the problem being looked at and the sort of solution required. The user should include all KM tools that could conceivably be relevant to allow for solutions to be derived that may otherwise not have been considered. Allowing managers to add their own columns to this section as the need arises keeps the house flexible in its uses.

6.3.3 Relationship and Totals (main body of the house)

The different tools under investigation are represented by the columns of the matrix with the problem broken down into components being the horizontal rows of the matrix. These components are defined in the extension area of the house. The tools are rated against each part of the problem breakdown to show if they will help solve that part of the problem. The rating system for this section ranges from 0 to 10. This range was found to be an optimal range for users to work with. A smaller range did not give results that clearly distinguished between the tools. A larger range became too cumbersome to use and made it difficult for the user to assign appropriate values. A score of 0 shows that the tool does not provide any solution for that part of the problem breakdown, and a score of 10 indicates that the tool will offer a complete solution for that particular part of the problem

Subtotals are calculated for each of the tools or techniques that have been considered. As there is both positive and negative sides to the problem there are two subtotals calculated. These subtotals are calculated by multiplying the rating for each problem part with the IT tool rating relevant to that part of the problem. This is all added up into one positive and one negative subtotal for each tool. For the positive features, the highest score shows the tool that is the most likely to offer the best solution at this stage. The negative subtotal for each tool is calculated in the same way but at this point the highest subtotal is the least desirable.

The Total section only considers the two subtotals that have been calculated. The negative subtotal is subtracted from the positive subtotal and gives an overall result for each tool. These totals can be used to decide which tool offers the best solution for the problem with the highest total showing which tool is the most likely to solve the problem. The subtotals and the individual ratings for each tool give an invaluable breakdown to the manager as to whether the tool will offer a complete solution or only a partial one.

6.3.4 The Tool Connections Area (The roof)

In initial experiments to create the HoKMTS, it was soon found that some tools could not be used independently. An example is a user-rating system. This tool could not be used without anything to rate! However, when used with, say, a discussion forum, the users' ratings of the helpfulness of points made in the discussion can help others to find elements of the discussion that were more likely to be of use in their own situation. It becomes important, therefore, to know which tools can be used together.

The roof section of the house is used, therefore, to show if two tools could be used together to provide a more complete solution to the problem.

6.3.5 Barriers Area (basement)

The barrier section is positioned in the basement of the house reflecting that although they may be hidden their solution underpins the solving of the problem. The barriers that have been selected to populate the house have been shown to influence the success of knowledge management initiatives. Including them allows the manager to see how issues outside of the knowledge management problem but still within the organisation may influence the successful implementation of the tool. Each barrier will be considered in two parts. The first is to ascertain the influence the barrier has on the success of the tool solving the problem and the second to consider how easy it is to overcome the barrier.

Both of these parts of the barrier are then rated against the tools. The barriers have not been given a numeric value as these are not incorporated into the final total section of the house. Instead they are rated by using a red, amber, green (RAG) system. When this section has been filled in for each tool the manager will be able to see if the barriers for the tool are likely to affect the success of the tool. A lot of red entries suggest that the barriers are a problem and a lot of green entries suggest that the barriers are not an issue. The amber results would show that the barrier will have some effect on the tool.

6.4 Case Study

An initial case study was undertaken to test the tool and check the results that were found in order to further develop the house. A knowledge problem from Loughborough University was selected to test the HoKMTS. The problem definition is *“How do people identify and communicate with potential collaborators from different disciplines?”* This is a particular problem in some research areas, for example Knowledge Management and Systems Engineering are disciplines that cross many departments within the university.

To start the process of populating the house with the relevant information each section was taken in turn and completed. The first task was to clarify the problem

itself and to break it down into components that would fill in the left hand extension or problem requirement area. The requirements would also need rating to show how important they are to solving the problem. The main requirement is for the solution to be able to find people within the University whose research was on a set topic. The search and locate requirement was given a 5 rating. The next requirement is communication and collaboration, and again a 5 rating was given for this, as the problem requires the user to converse with the people that have been located. Both innovation and storage are seen as regular components of knowledge management problems, but in this case they do not feature as requirements so they were given a 0 rating but still included in the house to show tools that could have this extra functionality. Reliability of the tool was also included and given a rating of 4 as any tool needed to offer a reliable solution but this was not considered to be as important as the first two requirements. The requirements above are positive ones as a rating of 5 shows them to be desirable qualities.

The following requirements are all negative ones where a rating of 5 shows them to be undesirable. The first of these is cost in money and a tool with a high rating would suggest that this is an expensive option. Cost in time to the user and the maintenance of the content are also important parts of the problem requirements and are rated accordingly.

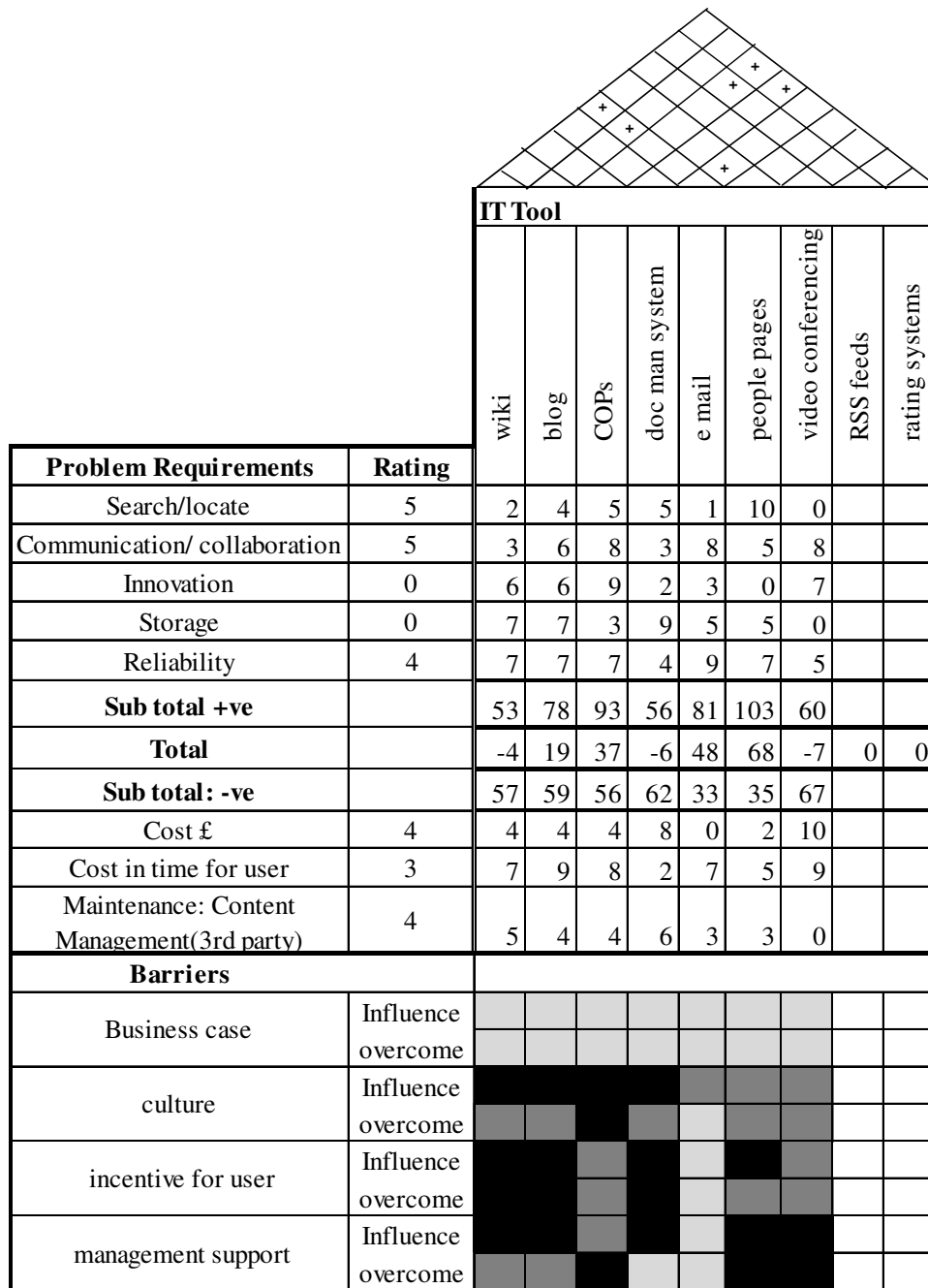
To populate the tool section on the top floor, a list of potential tools needs to be identified. For this problem an IT solution was sought. The IT tools that have been suggested are those that appear regularly within knowledge management literature, such as document management systems (Kankanhalli et al. 2003) and Web 2.0 technologies, which are becoming increasingly employed in companies (Lynch 2008). Tools being considered include blogs, wikis, RSS feeds and social networks (AIIM International 2008). A selection of tools already available in the University such as e-mail and people pages were also included to see if they could be applied to solve the problem. Whilst filling in this section it was noted that a list or classification of potential knowledge management tools would have been a useful starting point in deciding which tools would be suitable to fill this section of the

house, but that no list was found. A general list would have ensured that all possible tools were considered for inclusion in the house with the potential of finding a more innovative tool or one that would not have been previously thought about.

The third section to be completed was the relationships and results section in the main body of the house. Each tool was taken in turn and values between 0 and 10 were assigned for each part of the problem.

For video conferencing, it soon became apparent that it would not fulfil many of the requirements. The tool was allocated a score of 0 for the search and locate category due to it having no functionality that would help with this. It was given a score of 8 for communication as it would help achieve this as long as it was known who to communicate with. Although given a high score for innovation, this was not required by the problem and therefore did not add to the final subtotal score. The tool was allocated a high value for money and time in the lower part of the relationship and results section and thus it produced a high negative subtotal for this tool. The negative subtotal was taken away from the positive subtotal this left a negative result of -7, showing that the tool was unlikely to be of value for solving the problem. Similar logical arguments were used to derive the values allocated to the remaining tools in this section. One of the tools was allocated a maximum score of 10 for the search/locate problem requirement, but as this was a tool designed particularly for this purpose this seemed reasonable.

Due to figure 6.3 (below) being printed in black and white it is not possible to show red, amber and green. In order to overcome this red has represented by black, amber is represented by dark grey and green has become light grey.



Colour key: ■ black (red) = Major problem, ■ dark grey (yellow) = partial problem, ■ light grey (green) = not a problem

Figure 6.3 Case study House of Knowledge Management Tool Selection

The functionality that a tool has built into it could alter the rating it is given, for example, if the people pages had no search facility (e.g. It was just an alphabetical

list) it would not be given such a high score the search/locate requirement. While rating the tools it was also found that RSS feeds and rating systems did not work independently but would need to be added to another tool to make them work. This enabled the roof section to be populated.

From the totals results it can be seen that people pages offers the best solution with email coming second. The subtotals show that email has a very low negative subtotal in terms of cost due to it already being widely used. When looking at a tool such as a community of practice (COP) it is noted that this had the second highest positive subtotal but due to high costs that overall it only ended up as third in the total section. From this it can be deduced that it is important not to simply look at the totals section but that a manager needs to look at all the scores given to a tool to make an informed choice.

The barrier section in the basement has been populated with four barriers that have been seen to have caused knowledge management initiatives to fail (Du Plessis 2008; Steven and Kerno 2008). The barriers are then given either a red, amber or green colour for the influence that the barrier may have on the success of the tool in question. A second colour based on how hard it is to overcome this barrier is also given for that specific barrier. For the purpose of this chapter green is represented by light grey, amber by medium grey and red by dark grey. Looking at that part of the house in Figure 6.3 it can be seen that for email most of the barriers are green. This is due to the fact that email is widely used in the university and seen as a normal everyday tool. The other tools show more reds in their results with people pages showing that no management support has a strong influence over the tool being successful and that it will be hard to overcome.

6.4.1 Conclusion to the Case Study

From the case study it can be seen that the HoKMTS has been used to systematically evaluate the potential tools to solve a knowledge management problem. The problem used was a simple one with an obvious outcome. The pilot study has given a proof of concept but more research is necessary to explore the use of the tool in different

circumstances and by different users. To achieve this more case studies need to be undertaken.

One area of concern that became apparent as the house was being populated was the lack of a list of knowledge management tools being available to select from for the tools and techniques section of the house. How can a manager find the tools to complete this section of the house? One problem is that the tools that are entered here could be limited to those that are obvious or that the manager has heard of. This narrows down the possibilities of finding an innovative solution to a knowledge problem or to consider if a combination of tools could offer a better solution. A classification of knowledge management tools that could be used to help populate this area would offer the knowledge manager a resource to refer to. This would highlight tools that otherwise would not have been considered as knowledge management tools.

6.5 Literature Review of Classification Methods

The literature, from chapter two, was examined to determine whether an existing method of categorising knowledge management tools could be used by a knowledge manager to help populate the house.

From the literature it was found that there are two main ways to classify tools (Al-Ghassani et al.2002). The first is to investigate knowledge management processes and match tools to the processes. The second is to classify tools according to technology groups. A further development was found to be matching the technology groups to the knowledge management processes.

Classification by knowledge management processes has been approached by various authors who have produced slightly different processes. Ruggles (1997) split knowledge management into generation, codification and transfer and related them to the knowledge management tools. An example of this is Lotus Notes and NetMeeting which are tools that would facilitate knowledge transfer. This pattern was also followed by Wensley (2000) breaking down knowledge management into

acquire, store, deploy and add value. He then looked solely at web based tools such as Action Technology Tools and Documentum relating them to the 'add value' stage.

One problem that is apparent is which tools are used in a classification. Using tools that are defined by vendor can mean that the classification becomes dated as the tools become either obsolete or their functionality alters over time to keep up with the demands of the market. This has been bypassed by using generic categories for the tools (Al-Ghassani et al.2002). These generic categories are then matched to the various knowledge management processes. Jackson (1998), for instance, suggests that, for the process of storage, the tools would be 'linking, indexing and filtering'. The communication process involved tools such as 'sharing, collaboration and group decisions'.

These methods of looking at tools are still not helping a knowledge manager in understanding the value of knowledge management tools to their organisations and does not show enough detail about the tools that are being investigated. It can also be noted at this point that all the tools that have been examined by other authors are IT based tools. There is no consideration given to the non IT tools of knowledge management and yet it is recognised that knowledge management is not just about IT (Mohamed and Mohamed 2008). For example, the Knowledge Cafe (Dvir and Pasher 2004) can be an effective tool for knowledge generation, yet it does not require IT. The knowledge management processes that are being used in these classifications are very broad. The communication process can be approached in different ways such as publishing, face to face and transmission (Tyndale 2002) and tools may only address certain types of communication. This is not reflected in the classifications that have been carried out.

Al-Ghassani et al (2002) suggested that the second method used to classify tools is by technology group and found that these were not matched to knowledge management processes. For example, Gallupe (2001) suggested information retrieval programs and intelligent agents. Al-Ghassani et al (2002) further suggest that classifying knowledge management tools by the technology group that they are based

on is not very useful to an organisation when searching for a method to identify an appropriate tool.

Tyndale (2002), however, also classified tools by technology groups and then matched them to knowledge management activities. Tyndale (2002) suggested sixteen technology groups such as the Intranet and databases, and matched them to four knowledge processes, those being creation, organisation, distribution and application. However, by using technology groups as opposed to specific tools the results from the study by Tyndale (2002) showed that each technology group matched nearly all of the knowledge management activities that had been suggested and from a knowledge manager's point of view were still not specific enough to be of any use.

6.5.1 Conclusion to the Literature Review

From the literature review it can be concluded that a classification or way of examining knowledge management tools that can be used effectively by the knowledge manager or be applied to the house has not been found. The classification of tools that is available from the literature may not always offer the knowledge manager a clear solution as to which tool or technique may be the most suitable for an organisation to employ or even what part of a knowledge management problem it may be capable of addressing. When considering the knowledge management processes that were used, it was found that there were only a few processes which result in a large number of tools that could be applied to them. These knowledge processes could be further split into different types that the classifications did not address.

It was also concluded that the classification of knowledge management tools and techniques is normally limited to IT tools and no author has investigated the non IT options that exist to any great extent, if at all, and the more recent knowledge management tools are often not included. A more useful classification would be one that is flexible, that could be applied to various types of tools and that could be added to easily when new tools and techniques are identified.

6.6 The Knowledge Management Problem-Tool Classification Grid

To provide a useful method for classifying knowledge management tools that would apply to the house it was decided to match the knowledge management tools against the knowledge problem. This will give a knowledge manager a categorisation of tools that will allow the manager to understand which tools can address the particular knowledge problem that they are dealing with.

Having not found a definition for the term knowledge problem anywhere it was decided to define a knowledge problem as

'A problem caused by a lack of knowledge in a particular context'.

The knowledge problem was then broken down into several types so that the tools could be matched against a specific knowledge problem that they could help solve.

The final classification is aimed at being flexible so that it can include all types of knowledge management tools that will be classified i.e. both IT and non IT tools, ranging from forums and wikis to rating systems and storytelling.

6.6.1 Knowledge Problem Breakdown

The initial breakdown of the problem uncovered only six types of knowledge problem. Further brainstorming sessions were undertaken that involved looking at the tools and attempting to place them within the types of problem that had been identified. This highlighted a further four sections that needed to be included as the original list was too limited. Thus ten types have been identified that are regularly seen as part of knowledge management:

1. *Source signposting*: a form of mapping tool that enables the user to identify where knowledge may be available from.
2. *Search*

3. *Creation / innovation*
4. *Validation*: checking the value of knowledge
5. *Storage*: A tool that enables the knowledge to be stored so that it can be retrieved and used at a later date.
6. *Transfer/ distribution*: one way transfer of knowledge
7. *Collaboration/ sharing*: two way transfer of knowledge
8. *Tacit to explicit*: A tool that allows tacit knowledge to be changed into explicit knowledge
9. *Decision making*
10. *Representation/ analysis*

‘Source Signposting’ and ‘Searching’ were originally seen as the same as both were used to help find knowledge. On further investigation, the two were made into separate problem types as they were in fact slightly different. ‘Source Signposting’ requires structure in knowledge and a form of stored knowledge. ‘Searching’ does not require that structure, is more versatile in finding knowledge and is more likely to find knowledge that is not anticipated in the first place.

‘Tacit to Explicit’ is seen as means of capturing the knowledge in a person’s head so that it may be used by others. Without capture, such knowledge is lost when an employee leaves the company and takes the knowledge they have gained away with them. The tools are used in order to capture that knowledge so that it can be recorded and used again at a later date. This differs from ‘Creation/Innovation’ which focuses on generating completely new knowledge.

Communication was initially one type of knowledge problem. Through constant updating of the grid, it was recognised that this type of knowledge problem can be divided into two separate types of problem. The first was dealing with tools that offered one way communication and was labelled ‘Transfer/Distribution’ and the second was with tools that offered two way communications and was labelled ‘Collaboration/Sharing’. Although some tools such as email and forums could do

both, others such as blogs and RSS feeds could only be used in a one way distribution of knowledge.

6.6.2 Matching the Tools to the Problem Type

The tools are then matched to the part of the knowledge problem they are capable of solving. At this point it was decided that it would be more useful to the knowledge manager if the tools were put into groups for each type of the knowledge problem. Initially this division was decided in terms of how important the tool was to that section of the knowledge problem or how good it was at offering a solution. An attempt was made to order the tools for each problem type according to how much of that particular problem it would solve. A number of grades from “may be helpful” through to “very effective” were tried. However, it was decided that this was too subjective and the order of the tools in this sort of list could vary greatly from one person to the next. A more objective approach that would be of more use to a knowledge manager was to divide the knowledge areas into three levels. These levels are:

1. The main purpose of the tool
2. Added bonus
3. Not a guaranteed outcome

The first is ‘the main purpose of the tool’. Many of the tools have been found to have one main purpose that is associated with it, such as a document management system being primarily used for storage, though some tools can be found to have two purposes.

The second section that the tools are divided into is the ‘added bonus’ section. This section contains the tools that can also address this part of a knowledge problem but that it is not the primary function of the tool, and it may not be as efficient at providing a solution to that particular part of the knowledge problem in all circumstances. The tool would, however, help address this type of knowledge problem whenever it is used but it is not the tool’s primary intended purpose.

The third section that a tool may fall in is ‘not a guaranteed outcome’ section. This refers to the ability of a tool to sometimes address that part of a knowledge problem but that it will not always be able to do this. An example of this is the coffee machine or room which, because it brings people together, may lead to innovation and creation of knowledge but this is definitely not always going to happen.

6.6.3 Filling in the Grid

The tools were entered into the grid following several brainstorming sessions. Every time the grid was looked at the tools were moved around and new ones were added as the research team refined their ideas. It was found that moving the tools around into different positions in the grid led to a better understanding of the tools and their ability to address a particular type of knowledge problem. It also led to a clearer understanding of the types of knowledge problem and highlighted when a type of knowledge problem was either missing or could be viewed in a different way. Completing the grid meant that the categories for the knowledge problem types could be fully justified in any given context.

Table 6.1 shows the completed knowledge management tool grid. The grid was found to be flexible enough to add the non IT tools that are associated with knowledge management. From the completed grid it can be seen that tools such as the ‘coffee machine’ and ‘knowledge café’ have been included, both of which are non IT tools.

	Source	Search	Creation/ Innovation	Validation	Storage	Transfer/ Distribution	Collaboration/ Sharing	Tacit to Explicit	Decision Making	Representing/ Analysing
	people pages (expert directories)									
main purpose of the tool		data mining	brainstorming	ranking	databases	blogs	communities of practice	forum	mind mapping	ontologies
		search engines	data mining	rating	doc man system	community notice board	discussion board	lessons learnt log		xml
			mind mapping	reviews	lessons learnt log	email	forum	mind mapping		
			statistics	scoring	spreadsheet	FAQs	knowledge café	wiki		
					wiki	mentoring	videoconferencing			
						portal	wiki			
						reviews				
						RSS feeds				
						storytelling				
added bonus that the tool provides		document management system	communities of practice	forum	electronic calendar	communities of practice	brainstorming	blogs	brainstorming	databases
		email			email	forum	email	employee suggestions	data mining	mind mapping
					people pages	virtual reality	employee sugesions		ranking	ranking
					portals				scoring	scoring
										spreadsheet
not a guaranteed outcome.			coffee machine room			knoweldge café	coffee machine room	reviews	storytelling	portal
	email		forum		blogs		mentoring		reviews	
			knowledge café						reviews	

Table 1. Knowledge Management Tool Grid

A tool did not necessarily fit into each of the three levels. For example 'virtual reality' is not found in the 'main purpose of a tool' level but has successfully been used as a KM tool in a case study described by Dawson (2009) where it was a tool for knowledge communication. Virtual reality has been included in the grid as a tool that could be used for the transfer and distribution of knowledge. Although this tool is not normally associated with knowledge management, the grid shows its versatility by being able to include it.

Tools that were added to other categories or changed categories included Wikis. Following a conversation with knowledge workers at Airbus it was realised that they did not use wikis to simply capture knowledge but also to store knowledge. Airbus has found that wikis are becoming an increasingly popular tool due to them being easy to design, low cost and easy to use.

From the analysis of the tools it can be seen that no one tool can be matched to all the different divisions of the knowledge problem when taking into account the three different sections. In fact, except for 'forums', no tool managed to cover half of the knowledge problem types that have been suggested. This suggests that tools will need to be used in combination with each other in order to resolve knowledge deficiencies that involve several types of knowledge problem. Tools that are considered to be knowledge management tools did not appear significantly more often than those that are considered as tools that have leant themselves to knowledge management. For example, email occurs on the grid as often as the knowledge cafe.

Nearly all of the types of knowledge problem have a choice of tools at the top two levels with only two problem types, validation and capture, having no available tools at the 'not guaranteed' level. It was recognised that the tools could potentially be moved to different levels and to different problem types on the grid depending on who was populating it and the organisation that was involved. The grid as created by the authors should, therefore, not be used blindly but an assessment of the tools and categories should be carried out to ensure they are in the correct place for the purpose they are being used for in the context of the organisation where they will be used.

6.7 Conclusion for the Knowledge Management Problem-Tool Classification Grid

The knowledge management problem-tool classification grid is an effective way for a knowledge manager to understand the potential of knowledge management tools. It clearly shows which tools are appropriate for each type of knowledge problem and gives the knowledge manager a choice to select from, including IT tools, non IT tools, recent tools and those tools that are not always associated with knowledge management problems. Carefully assigning each tool to the different parts of the grid has been found to give a greater understanding of the nature of the tools in the context where they will be used. It is therefore recommended that managers take the time to create and fill in their own version of the grid rather than taking the populated grid exactly as illustrated in this chapter.

Once the grid has been created, it will help in populating the House of Knowledge Management Tool Selection in the area that requires the list of tools, and will also give a better insight and understanding of the knowledge problem requirement section. Used with the house in this way, the proposed knowledge management tool categorisation will assist managers in selecting the most appropriate tool to solve a particular problem within a particular organisation.

The research also suggests the grid could also be used as an evaluation tool for existing knowledge management systems in an organisation, and future research will examine this potential use of the classification system proposed. Further research should also be able to develop and improve the tool such that it could become an essential part of a manager's decision making toolkit.

6.8 Overall Conclusion

This chapter has identified two useful tools to assist Knowledge Managers in their decision making processes when deciding which knowledge management tools to implement to address a particular problem in a particular environment. The House of

Knowledge Management Tool Selection is a simple graphical tool that can enable managers to evaluate the potential knowledge management tools to solve a particular problem in the context of their company environment. The knowledge management problem-tool classification grid helps managers to understand the nature and use of the knowledge management tools in their company context and this, in turn can help them populate the House of Knowledge Management Tool Selection with suitable tools for consideration. The two proposed tools are therefore complimentary.

Both of the tools proposed in this chapter have the advantage of being able to handle non IT tools as well as IT tools, and both have the flexibility to be extended or tailored for any particular working environment. The use of these tools together would assist knowledge managers to increase their understanding of the knowledge management tools they have available and make better considered decisions concerning knowledge management tool deployment. These decisions should, therefore, increase the chances of success for the tools implemented which, in turn, should lead to a better quality knowledge environment.

CHAPTER 7

ANALYSIS OF THE KNOWLEDGE PROBLEM AT NOTTINGHAMSHIRE COUNTY COUNCIL USING THE HOUSE

7.1 Introduction

This chapter uses the House of Knowledge Management Tool Selection developed in the previous chapter to analyse the knowledge problem discovered at Nottinghamshire County Council (NCC) in chapter four. This fulfils objective five from chapter one by carrying out case studies to further test, refine and develop the house.

The case study at NCC, in chapter four, identified a range of issues with the approach taken by the council to solve their knowledge problem. This chapter investigates whether the House of Knowledge Management Tool Selection would have offered a better method of evaluating the knowledge problem at the council. The house will be used to give a systematic evaluation of the knowledge problem rather than the haphazard approach taken by the council. The results found by the house can then be compared to those conclusions reached by the council to see if they match and the same decisions would have been taken or whether the council should have considered taking a different approach to solving their knowledge problem. The processes used by the house and those used by the council will be compared to find the similarities and differences and to analyse whether the house addresses the issues raised with the process used by the council.

7.2 The Issues with the Approach Taken by the Council

From chapter four, the issues with the approach taken by the council were identified, during the case study, as:

1. only a limited analysis of the initial knowledge problem

2. other potential tools were not considered
3. tools used presently at the council were not evaluated
4. the timing of the business case was inappropriate
5. problems were invented to justify the tool
6. the methodology for selecting a knowledge management tool was poorly defined
7. the users and those involved in the project had a lack of knowledge about the proposed tools
8. risks and issues were not analysed
9. the users and their culture were not given proper consideration
10. business processes were lacking in the organisation at present

The house will be used to investigate the knowledge problem and the findings will be analysed to see if using the house will answer some, if not all, of the issues raised by the case study. The process used by the house to analyse the council's problem will be analysed and subsequently compared to that used by the council to determine which process offers a more complete solution.

7.3 The Knowledge Problem and the House

The results of the case study show several ways in which the house could be used to evaluate the knowledge problem at the council. Three different houses were explored in order to address the issues raised by the case study. Each house was used to analyse the problem from a slightly different angle with the potential to show how flexible the house can be in a given situation. The results from each house could then be compared with those reached by the council to ascertain whether the same decisions would have been taken if the council had had a systematic method for evaluating the knowledge problem and all the possible solutions.

The case study showed that the council started with a document management problem. Although they had already got some document management solutions being used at the council it was felt that they were not suitable and not giving the results required. Little investigation as to why they were not working as required was carried out. The council decided that SharePoint would offer the solution required

though very little analysis on SharePoint, the costs involved, and the value to the organisation were carried out. The first house that was completed, therefore, analysed the original knowledge problem that had been recognised and SharePoint as a possible solution to the problem.

The second house took into consideration the findings of the benefit profiling exercise. The benefit profiling exercise was carried out to investigate what other benefits SharePoint could offer the council after the decision had been taken to use SharePoint. The profiling exercise was used, therefore, to justify the decision to use SharePoint rather than evaluate the potential benefits of using SharePoint. The second house was an expanded version of the first house. The knowledge problem was expanded to cover the findings of the benefit profiling exercise and the barriers section was also expanded following the increased issues that were discovered. SharePoint was the tool being investigated in the second house and remained the same as the first house.

The third house investigated the other tools that were used at the council as they had not been analysed by the council. This could show whether any other tool would offer a better solution or if tools already employed were as bad as described by the council. If the other tools were seen to offer similar solutions then further analysis of the house could be used to show that the problem at the council was not based solely on the poor functionality of the tools that were being used but on the processes involved or the users of the tools.

The houses were completed by the researcher based on the interview questions asked and observations made during the action research undertaken at the council. This approach to populating the house shows how the house could be completed by an expert gaining the knowledge to populate the house by using methods such as action research and interviews.

The ratings were based in some cases by the results found during the benefit profiling exercise. These were reached by the researcher and a member of staff at the council during meetings. These ratings were then transferred by the researcher to the appropriate position in the house. The tool ratings were based on the results of

brainstorming sessions with the researcher and research supervisor as well as based on the observations made whilst at the council.

This method of populating the house shows how the house could be completed by an expert rather than asking individuals to populate the house themselves. The lack of understanding of SharePoint and its functionality would have made it difficult for individual users to populate the house though this may have highlighted even more of the potential issues such as having an understanding of the tools involved.

7.4 The First House: Initial Problem House

This house was completed based on the initial information and knowledge problem that the council recognised. This was a document management issue caused by the present system being highly paper based. The council selected SharePoint as the tool they were going to implement to solve the problem. The council undertook very little analysis of their problem and of SharePoint. The Initial Problem House will be used to analyse this initial problem and SharePoint, to ascertain whether using the house would have come to the same conclusions as those reached by the council that SharePoint was the right tool to use to solve the problem.

7.4.1 Populating the House

Chapter six discussed how the house could be populated. The house is broken down into several sections and each section is completed in turn ensuring a methodological approach to analysing the knowledge problem, the potential tools and the barriers. The sections to be populated are the problem requirement, the tool section, the total area and the barrier basement.

The problem requirement area

The problem requirement section is the first section of the house to be completed. Situated on the left hand side of the house, this section shows a breakdown of the knowledge problem into requirements.

The initial problem at the council revolved around document management. The highly paper based system had led to issues with saving and finding files, naming conventions of files and sharing files. There were also projects in place within the council to reduce printing costs. At present, emails and other electronic paperwork is regularly printed out in full as this seen by the users as the easiest method of saving documents. A lack of version control of documents has been noted with users unsure whether the documents that they are working from are, in fact, the most up to date version of those documents. It was also found that each user would print out their own copies of files that they were working on leading to multiple copies of files and with electronic copies of files, where they were used, being saved onto users own machines leading to further multiple copies of files. There were no processes in place to prevent this from happening.

Table 7.1 shows the initial problem and the problem requirements that were subsequently decided upon to be included in the house. The problem requirements were given a rating between 0 and 5. 0 signified that the problem requirement was of no consequence and 5 that the requirement was seen as very important. From the original house in chapter 6 some problem requirements were considered to be negative ones where a rating of 5 would show them to be undesirable. In the case study at the council only one such negative requirement was found and that is the cost in time to the user. One of the main requirements of the council was that introducing SharePoint would increase efficiency and save time for the users as finding and handling documents would become a lot quicker.

Table7.1: Problem requirements

Initial council problem	Problem requirement	Rating assigned	Reason for the rating
Users are unable to find files easily and quickly	Search/locate files	5	Managers unable to work efficiently
users are unable to share files efficiently across departments	Share files	4	This is seen as slightly less important than actually finding the files
Users need to be sure they are working with the latest version of a file	Version control of files	5	Time wasted working on and updating the wrong files

Initial council problem	Problem requirement	Rating assigned	Reason for the rating
Files need to be stored electronically to cut down on paper and space. Related files need to be stored together.	Storage of files	4	Slightly less important
Naming conventions need to be created and maintained, making it easier for users to find files again	Naming conventions of files	5	Important to be able locate files again
Files and emails are printed off by users due to lack of easy to use, electronic storage methods. Documents received by department are kept in paper format and not scanned for electronic storage. Paper is everywhere. Files are lost, misplaced and damaged.	Reduce amount of paper	5	Important due to cost involved with losing paperwork
Large amount of paper files requiring large amounts of storage space	Reduce physical storage space	5	Important due to cost of floor space
Reduction in costs associated with printing such as paper, ink and printers	Reduction in printing costs	3	Part of another project to reduce the amount of printing and associated costs so not seen as important
Reduce time spent by workers searching, printing and handling files.	cost in time for user	4	Important as users waste time searching and handling files

The problem requirement and rating columns from table 7.1 are then used to populate the house as seen in figure 7.1.

The technique or tool area

This is the top floor area of the house. It represents all the tools and techniques that could potentially be used to solve the knowledge problem. In chapter six, the Knowledge Management Tool grid was developed to aid selecting tools for this area of the house. In the case of the council, however, SharePoint has already been selected as the tool to be used. For this version of the house, SharePoint will be

assessed from the point of view of the functionality that it provides to the end user, to discover whether SharePoint offers a solution to the initial problem set out by the council. The SharePoint features selected to populate the house were based on those mentioned in the marketing presentation and demonstration that Microsoft carried out at the Council, as well as research carried out into the functionality of the tool. The functions of SharePoint selected can be found in table 7.2 with brief descriptions (Microsoft 2011). The list is not exhaustive but includes the main features that the end user would be able to access. Functions such as ‘Streamlined Central Administration’ and ‘SharePoint Health Analyser’ were omitted as the end users in the problem scenario would not be using them in their roles.

Table 7.2: SharePoint functions

SharePoint Function	Description
Intranet/extranet	Intranet and extranet facilities are a standard part of SharePoint. SharePoint provides a single infrastructure for all business websites Making it easier for users to manage and share documents.
E-forms	These can be created and hosted easily in SharePoint in order to gather information easily and quickly.
Searchable document storage (FAST: extra cost)	The search facilities are based on metadata. SharePoint expects users to enter the metadata themselves for each document in order to facilitate a better response to a search but the FAST search system which works with SharePoint (This is an extra cost on top of buying SharePoint) will fill in the metadata itself. FAST search is marketed as enabling users to quickly find documents and information. The search facility is available across the whole system or any part of the system as the user decides.
Document libraries	Document sets can manage related content as a single entity. File plan reports can be created for analysis in Excel. Use flexible records management processes to control documents. Content does need managing to gain the most out of the SharePoint’s capabilities.
Document security	Rights management allows control of documents preventing them from being downloaded and checks who has read or opened a document. There are features to aid with version control apply retention schedules and place legal holds on information.
RSS feeds	Groups can be set up to automatically receive the latest news regarding their areas of interest.

SharePoint Function	Description
Email notification	Users are notified by email of tasks that need doing or documents that need their attention based on workflows such as documents that need reviewing or updating.
Team sites	Sites can be easily set up by a team or project which can include calendars, tasks, timelines and document areas.
Team/individual calendars	These can be displayed as well as overlaying of calendars and the ability to sync calendars making it easier to arrange meetings.
People pages/people search/my site	Users are prompted to update their 'my site' and people page areas with suggestions for topics to be included given based on their searches and email topics.
Discussion forums	SharePoint provides discussion forums and FAQ facilities.
Social network connected to people pages	This area has more of a Facebook type feel to it with communities and areas and links to items and people of interest. SharePoint uses filtering and sorting based on social distant such as 'who do I know' and 'who does my colleague know' to pull social networking together.
Blogs	Available as part of SharePoint being described, (Microsoft 2011) as a 'familiar and easy to use set of collaboration tools'.
Wiki	Wikis are seen as part of the collaboration tools as well, allowing users to have several different ways of being able to work together and finding a way that is effective for them.
Performance monitoring	Status Indicator Lists contain Key Performance Indicators (KPIs) which allow an organisation to keep up to date with strategic initiatives and processes. Scorecards can also be displayed.
Workflows/process flows	Workflows can be designed in Microsoft Visio (extra cost, not part of SharePoint) and used in SharePoint that will automatically prompt a user when a document needs their attention. This helps to manage the lifecycle of documents. The flow of a process is constructed by a business analysis who knows the workflow.
Project tools/tasks	These can be displayed in the team site areas, for instance, allowing instant access to teams to follow progress in a project situation. Databases designed in Access can be easily integrated and accessed through SharePoint.
Dashboards/organisational charts	Organisational charts and other charts and diagrams can be displayed. Interactive dashboards allowing users to access and use information easily.

The relationship and totals section

In this area each tool or function is rated against the problem requirements. This will show which parts of SharePoint are likely to be used to solve the initial problem at the council. From figure 7.1 it can be seen that the main body of the house has been completed by assigning ratings to the tools for each part of the knowledge problem showing if they will help solve that part of the problem. Completing the ratings entailed having a good understanding of both the problem and the ability of the tool to solve that problem. This again results in a more detailed analysis of both the tools and the problem.

Many of the functions were given ratings of 0 as they were found to have no effect on solving the problem at all. The results of the ratings show that all of the problem requirements identified by the council, with the exception of 'naming conventions of files', were offered a solution by at least one of the functions of SharePoint. The council noted that there were issues with the naming of files due to each department and even within the same department having different methods of naming the same file. Files could be named with a combination of place names, dates and identification numbers that only applied to one particular team. It was felt that 'document libraries' would aid a more structured approach to naming files but that the structure would have to be agreed upon and installed by management first. This problem requirement that the council recognised will need resolving by management and the house shows it will not be resolved by the introduction of a tool.

The subtotal and total rows in figure 7.1 show that the three functions most likely to be used were the document libraries, the search facilities and document security as these have the highest values. At the other end of the scale four functions came back with scores of zero showing they would be of no use in solving the problem and five areas came back with negative scores. These negative scores show that the function had no use in solving the problem at all but if users did use those functions it would take up the users' time. This leads to user time being taken up in an activity that they would not have otherwise done and not one that would aid the document management issue.

The barrier basement

This area of the house deals with the potential barriers to a successful implementation of a tool. All the barriers are considered in terms of the influence they may have on the success of a tool and how easy or difficult it may be to overcome the barrier. The barriers show no connection to the problem. Originally this section of the house was completed using red/amber/green (RAG) to represent how likely a barrier was to affect the success of a tool. This was found to be a problem with printing for conference and journal papers, due to the colour, and ticks, crosses and dots were used to keep everything in black and white instead. The ticks replaced green to indicate that a barrier was not an issue, dots replaced amber showing that a barrier may have some effect and crosses replaced red indicating that a barrier will have a detrimental effect on the success of a tool. Only four barriers were recognised by the council but no further analysis of them was undertaken.

- Culture

The culture of the workers at the council is that they are strongly paper based, resistant to change, and wary of IT solutions. Although they appreciate that the present system is not without its flaws they feel safe and happy using it. During the interviews that were carried out there appeared to be a strong bias against using any form of social networking type tool. The demonstration by Microsoft showed the attitude of potential users and managers to tools such as the people pages with users being unwilling to fill them in. The lack of collaboration and sharing shown by the potential users will influence the use that is made of the other functions of SharePoint as well. There is a general lack of trust in the IT systems that are already in place and this also will prevent the uptake of these tools. The completed house (figure 7.1) shows that the culture has a strong influence on nearly all the SharePoint functions that were investigated.

- Management support

Management seem as sceptical of IT solutions as the rest of the organisation. Although they appreciate that the present system needs streamlining there is an unwillingness to commit to change unless it can be proved that it will work.

Consequently management support as a barrier shows that it will influence most areas of SharePoint and could be difficult to overcome.

- Legal requirements

There are legal issues surrounding documents that need clarifying that will affect some areas of SharePoint as there is no unified and clear understanding of them at present amongst the workforce. An example of issues with the legal requirements is the lack of understanding by users over which documents need to be kept in their original paper based format and which documents can be scanned and the originals discarded. Many of the users that were interviewed had completely different views on this with some users keeping all originals and others not keeping any. Management seemed to have no clear idea either.

- Integration of existing applications

There are databases that will need integrating as well as the issue of all documents that are paper based. Scanning them is one possible answer but the vast quantity would make this a highly time consuming process. Many of the functions within SharePoint would be new and, therefore, do not require any integration.

Applying the NCC case study to the house has demonstrated that in order to populate the barrier section of the house a clear understanding of what is meant by the barrier in this particular scenario is required, as well as a clear understanding of what the present position is within the organisation. Completing this section forces the user of the house to systematically evaluate and understand each of the barriers which the council failed to do using their own process.

The tool connection area (the roof)

From chapter 6 the roof area was created to show which tools could work together to give a better solution to a problem. The Initial Problem House is only concerned with SharePoint and the functionality it provides. This all comes 'out of the box' with the product and, therefore, there is no need to consider which tools would work together in order to provide a more complete solution.

		SharePoint functions																	
		Intranet/extranet	e forms	searchable doc storage (FAST: extra cost)	Document Libraries	Document security	RSS feeds	email notification	Team sites	team/individual calendars	people pages/people search/my site	Discussion/ forums	social network connected to people pages	blogs	wiki	performance monitoring	workflows/ process flows	Project tools/tasks	Dashboards/organisational charts
Problem Requirements	Rating																		
Search/locate files	5	0	0	10	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0
Share files	4	7	0	10	9	7	0	0	6	0	0	0	0	0	0	0	0	0	0
Version control of files	5	0	0	7	8	9	0	0	0	0	0	0	0	0	0	0	4	0	0
Storage of files	4	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Naming conventions of files	5	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduce amount of paper	5	0	5	7	8	6	0	0	0	3	2	0	0	0	0	0	0	0	0
Reduce physical storage space	5	0	2	9	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduction in printing costs	3	0	4	4	8	0	1	0	3	3	0	0	0	0	0	0	0	0	0
Subtotal +ve		28	47	217	280	138	3	0	33	24	10	0	0	0	0	0	20	0	0
Total		28	47	217	280	138	3	0	9	12	10	20	20	20	20	0	20	0	0
Subtotal: -ve		0	0	0	0	0	0	0	24	12	20	20	20	20	20	0	0	0	0
Cost in time for user	4	0	0	0	0	0	0	0	6	3	5	5	5	5	5	0	0	0	0
Barriers																			
culture	Influence	•	•	•	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	overcome	×	×	×	×	×	•	•	×	×	×	×	×	×	×	×	×	×	×
management support	Influence	•	•	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	overcome	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Legal requirements	Influence	×	✓	×	×	×	•	•	•	✓	✓	•	✓	•	•	✓	✓	✓	✓
	overcome	×	✓	×	×	×	•	•	•	✓	✓	•	✓	•	•	✓	✓	✓	✓
Integration of existing applications	Influence	×	×	×	×	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	overcome	×	•	×	×	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Figure 7.1: Initial Problem House

7.4.2 Conclusions Drawn from the House about the NCC Problem

The house shows that SharePoint does offer the document management solution that the council requires. The ratings show that SharePoint is capable of offering solutions to all the problem requirements with the only exception being 'naming conventions of files'. However, of the eighteen functions of SharePoint, nine offered either no value to solving the problem or will have a negative effect on solving the problem. This indicates that half of SharePoint will not be used in order to solve the document management problem. There are also issues with the barriers especially culture and management support. The results from the table show that the two areas of SharePoint that would, potentially, be used the most, 'searchable document storage' and 'document libraries', also have the most barrier issues associated with them. This suggests, when taking into account the cost involved with SharePoint, that the council would find it hard to justify introducing SharePoint into the organisation at this point especially in the present economic climate. The house does show that there is a need to further justify selecting SharePoint to solve the original document management problem.

7.4.3 Conclusions from Completing the Initial Problem House

This house has helped to address some of the issues raised by the case study. It has given a systematic approach to analysing both the problem and the tool that had been selected. There were ten issues raised by the case study at NCC. The first issue showed that only a limited analysis of the knowledge problem was carried out. Completing the problem requirement section of the house forces the user to consider the problem in more detail. The resulting problem requirement section shows the very narrow view that the council took when considering the problem. They did not investigate it in any depth, shown by the limited number of problem requirements, and all the requirements were considered important but that no other requirements were considered at all.

Issue seven from the case study showed that NCC had a very limited understanding of all the available functionality that SharePoint had to offer. However, in order to complete the tool area of the house a better understanding of the tool is required that

necessitates further research into all of the features of SharePoint. Had the council used the house to select an appropriate tool it would have forced the council to increase its knowledge of SharePoint or at the very least made the council realise how little was known about the tool and how much of the tool was not actually going to be used.

The barrier basement area of the house also shows a lack of consideration by the council, of the issues and risks that could be associated with their knowledge problem. Issue 8 from the case study highlighted that no analysis was carried out on the potential barriers. The house, again, would have forced the council into spending more time considering the impact of the risks with the potential of discovering more barriers. Using the house to evaluate the barriers has shown that they will impact on the implementation of SharePoint and that the barriers do need to be taken into consideration.

Overall the Initial Problem house has shown a more systematic way of evaluating a knowledge problem and investigating how appropriate a tool is at solving that problem. A more in depth analysis of the problem, tool and barriers was required to complete the house and there was as much value to be gained from going through the process of populating the house as the results from the house themselves.

7.5 The Second House: Benefit Profiling House

The second house investigates the findings from the benefit profiling exercise. The problem requirements section was expanded to include the new problems that had been discovered and the barrier section took into account the new issues that had been recognised during the benefit profiling exercise. The SharePoint functionality remained the same as in the Initial Problem House. To discover if the implementation of SharePoint can be further justified, the house will be used to evaluate the findings of the benefit profiling exercise. The issue with this is that problems are being found to justify implementing SharePoint rather than SharePoint being used to solve recognised problems.

The findings from the Benefit Profiling House will be compared to the results of the Initial Problem House to ascertain whether implementing SharePoint can be any more justified following the benefit profiling exercise.

7.5.1 Populating the Benefit Profiling House

The same areas as the previous house will be populated.

The problem requirement area

The problem requirement area will be expanded to include requirements recognised during the benefit profiling exercise and these new requirements will have ratings assigned to them. Table 4.2 shows the benefits that were discovered. Some of the benefits recognised are part of the original problem but the exercise confirmed this and found new problems to be considered. Of the eight problem requirements originally considered by the council seven were mentioned during the benefit profiling exercise. These were all related to the document management problem. The only one not mentioned was 'reduce paper'.

Only five new problem requirements were discovered as many of the benefits mentioned were found to focus on the same problem, that of being able to find and share information and documents. The new problem requirements are:

1. Improved disaster management: Although mentioned in initial meetings this was never included in the Initial Problem House.
2. Searchable contact details: This facility is already available in the present intranet system but due to a combination of lack of training and incomplete details users keep handwritten paper copies of these details.
3. Ability to coordinate and view meetings and site visits: At present this is mainly carried out using desk diaries and paper charts even though electronic solutions are available.
4. Ability to share information and knowledge across teams: Sharing information was mentioned as a problem several times, relating mainly to issues with managing documents and finding information.

5. Improved response time to customer enquiries: This ranged from answering phone enquiries to reducing time for processing applications.

Completing the problem requirements area led to better understanding of the benefit profiling results and the problems that were the cause of the benefits. This analysis of the findings has as much value, if not more, than the actual results given by the house.

The ratings for the new problem requirements were lower than the initial ones due to the new ones being seen as less important. Consequently, Ratings of two or three were assigned to the new problem requirements.

Some of the benefits found in table 4.2 could not be directly associated to SharePoint, such as email. The present email problems are due to how the email system is set up. This will not be improved by implementing SharePoint but by upgrading the email system or changing the email client to Outlook from Lotus Notes to offer the best results, due to better compatibility between SharePoint and Outlook.

Table 4.3 showed the “disbenefits” (a term used by the Council) found during the benefit profiling exercise but only one of these was added to the problem requirement area. This was the ‘increase scanning’ which was added to the negative area of the problem requirement section.

The final problem requirements and ratings can be seen in the house in figure 7.2.

The technique or tool area

The tool being investigated is still SharePoint; therefore, this area remained unchanged from the Initial Problem House.

The relationship and totals area

This area was populated with the relevant ratings. The problem requirements from the Initial Problem House retained the same ratings they were given in the first house, as the SharePoint functions have not changed. The additional problems that

have been added due to benefit profile were rated against the SharePoint functions (figure 7.2).

From figure 7.2 it can be seen that all the new problems requirements that have been added have found solutions. This is not surprising as they came from the benefit profiling exercise that was searching for other uses that could be made of SharePoint in the organisation.

The addition of the problem requirements from the benefit profiling exercise found that some of the tools previously unused now had values in the subtotal and totals rows. There is an increase in the potential use of 'team sites', 'calendars' and 'people pages'. The new problem requirement that SharePoint helps to address the most is the 'ability to share information across teams'. This is not surprising as SharePoint is advertised by Microsoft (2011) as 'Collaboration Software for the Enterprise'.

However, the results show that two tools, 'performance monitoring' and 'email notification' still have no ratings and three of the tools still have negative values in the totals row. These are 'discussion forums', 'wikis' and 'blogs'. This is not surprising as the response to social networking type tools from those interviewed was not positive with users finding no reason for using them in the work place. The results show that they are time consuming to the user and none of the problem requirements could use them as a solution. This still results in five of the eighteen tools not being used at all compared to the nine in the Initial Problem House. There are three tools with low scores (ten or less). These results demonstrate that SharePoint will still not be used to its full potential. The functions of SharePoint that will be of most value remain the same for this house as the previous one.

The only negative problem requirement added was the additional time that would be spent scanning paper documents in order for them to be stored electronically. Planning applications and letters are still received in paper format although the facilities are in place for them to be sent in electronically from the public. The only problem requirement that this will affect is the usage of the document library function to store documents. There is the issue of scanning past paper work once the system is up and running otherwise the document libraries will be empty. At present

the plan is that only documents that are being used will be moved over to this system from the paper system as the task of scanning everything would be too large. Documents that are already electronic will be migrated into SharePoint.

Overall this area of the house shows that after adding the additional problem requirements found during the benefit profiling exercise that SharePoint still be underused.

The barrier basement

Part of the benefit profiling exercise was to identify risks than could impact on the success of introducing SharePoint. Having identified these risks, the council took no further action in finding steps to reduce the impact they may have on the project as mentioned in issue eight, section 7.2. Including these risks in the barrier basement area of the house would allow the council to analyse the affect they may have on the success of implementing SharePoint.

The risks identified during the case study at the council can be found in table 4.4. The initial problem only identified four of these, all which were mentioned during the benefit profiling exercise. A further eight barriers were included in the Benefit Profiling House (figure 7.2). The original barriers kept the same combination of ticks, dots and crosses as in the Initial problem House.

The new barriers were rated. From figure 7.2 it can be seen that many of the new barriers were assigned crosses to show that they will have a strong influence on the successful usage of the tool and that they will be hard to overcome. An example of this is training. At present there is no training given when a new IT tool becomes available. This has included using the intranet search facility and electronic calendars. Consequently, the council seem to have little experience, inclination or facilities to provide training which has led in the past to tools remaining unused, leading to the crosses assigned to this barrier.

Analysing the types of barriers included in the house it can be seen that many of them are people related. This ranges from lack of training, lack of incentives, lack of IT ability, lack of help for the users and culture. All of these barriers for all of the

SharePoint functions, with the exception of the intranet, have been assigned crosses. This shows the influence that the people aspect can have on the success of a knowledge management project.

Email was mentioned by those that were interviewed as being a big issue with managing and moving documents as well as highly time consuming. The barrier basement shows that email will only affect four areas of SharePoint and that they are easier to overcome than many of the other barriers. It does affect the 'document libraries' function of SharePoint, which is the main function that would be used, due to the difficulties in moving documents, files and copies of emails from email to document repositories caused by the present email client that is being used. The email system will not prevent SharePoint from being used and it is a barrier relatively easy to overcome.

The tool connection area (the roof)

This area was again not required as in the Initial Problem House.

Figure 7.2 shows the populated house following the benefit profiling exercise.

		SharePoint functions																		
		Intranet /extranet	e forms	searchable doc storage (FAST:extra cost)	Document Libraries	Document security	RSS feeds	email notification	Team sites	team/individual calendars	people pages/people search/my site	Discussion/ forums	social network connected to people pages	blogs	wiki	performance monitoring	workflows/ process flows	Project tools/tasks	Dashboards/organisational charts	
Problem Requirements	Rating																			
Search/locate files	5	0	0	10	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Share files	4	7	0	10	9	7	0	0	6	0	0	0	0	0	0	0	0	0	0	0
Version control of files	5	0	0	7	8	9	0	0	0	0	0	0	0	0	0	0	0	4	0	0
Storage of files	4	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Naming conventions of files	5	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduce amount of paper	5	0	5	7	8	6	0	0	0	3	2	0	0	0	0	0	0	0	0	0
Reduce physical storage space	5	0	2	9	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduction in printing costs	3	0	4	4	8	0	1	0	3	3	0	0	0	0	0	0	0	0	0	0
Improving disaster management	4	0	0	4	8	9	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Searchable contact details	3	5	0	0	0	0	0	0	5	0	10	0	5	0	0	0	0	0	0	0
Ability to coordinate and view site visits and meetings	2	0	0	0	0	0	0	0	6	6	2	0	0	0	0	0	0	0	0	0
Ability to share information across teams	2	8	0	8	5	8	7	0	8	8	7	5	5	0	5	0	0	5	5	5
Improve response times to customer enquiries	2	0	5	5	5	0	0	0	6	6	6	0	0	0	0	0	0	0	0	0
Sub total +ve		59	57	259	332	190	17	0	88	64	70	10	25	0	10	0	32	10	10	10
Total		59	57	259	300	190	17	0	64	52	50	-10	5	-20	-10	0	32	10	10	10
Sub total: -ve		0	0	0	32	0	0	0	24	12	20	20	20	20	20	0	0	0	0	0
Cost in time for user	4	0	0	0	0	0	0	0	6	3	5	5	5	5	5	0	0	0	0	0
increase scanning	4	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barriers																				
Training	Influence	•	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	overcome	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
culture	Influence	•	•	•	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	overcome	x	x	x	x	x	•	•	x	x	x	x	x	x	x	x	x	x	x	x
incentive for user	Influence	•	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	overcome	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
management support	Influence	•	•	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	overcome	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
business processes	Influence	•	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	overcome	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
IT ability of users	Influence	•	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	overcome	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
help for users	Influence	•	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	overcome	•	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Legal requirements	Influence	x	✓	x	x	x	•	•	•	✓	✓	•	✓	•	•	✓	✓	✓	✓	✓
	overcome	x	✓	x	x	x	x	x	x	✓	✓	x	✓	x	x	✓	✓	✓	✓	✓
Integration of existing applications	Influence	x	x	x	x	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	overcome	x	•	x	x	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IT ability of organisation	Influence	•	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	overcome	•	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Email system	Influence	✓	x	✓	x	✓	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	overcome	✓	•	✓	•	✓	•	•	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lack of awareness of tools	Influence	✓	•	•	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	overcome	✓	•	•	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Figure 7.2: The Benefit Profiling House

7.5.2 Conclusions Reached from Completing the Benefit Profiling House

From the Benefit Profiling House it can be concluded that SharePoint still has functions that will not be used even after trying to find problems to fit the tool. The results are slightly better than in the first house but nearly half of SharePoint is either not used at all or only slightly used and that is address problems that were not really considered problems at all. The question still remains as to whether the benefits of implementing SharePoint are worth the costs involved.

The barriers have significantly increased in size compared to the extra problem requirements found. The barrier basement has shown that the successful implementation of SharePoint could be adversely affected by influences from the organisation in general and outside of the knowledge problem. The council showed no signs of using the knowledge gained by carrying out the risk analysis but the house shows clearly the affect that the barriers could have. The house does not show, however, any solutions to these barriers or if the solutions would further affect the problem requirements. This could be further investigated in an attempt to derive a tool to analyse the barriers in more detail.

7.6 The Third House: Alternative Tool House

One of the issues that the case study identified was a lack of investigation into other potential tools (Issues 2 and 3, section 7.2). This included those used already as well as tools that could have been considered at the same time as SharePoint. The house was used to evaluate the tools that were already present in the organisation to ascertain whether they could have been used to solve the knowledge problem. SharePoint was evaluated with the other tools to see if it really did offer a better solution.

The house shows all tools available and investigates whether the tools that are already available could solve the problem as well as SharePoint. This could help justify that SharePoint was really the best solution. The house was also used to highlight where issues may be that affect all the tools and show whether the knowledge problem was being caused by the tools themselves or by the inability of the council to use them efficiently.

7.6.1 Populating the House

The sections to be populated are the same as the previous two houses.

Problem requirement area

The problem requirements selected were those that were seen as the original problem that NCC started with. The ratings were also kept the same as in the original house. Using this set of problem requirements was decided upon as it should have been at this point a clear understanding of the available tools and the associated issues with them should have been investigated.

The negative part of the problem the ‘cost in time for the user’ was completed by assuming that users knew how to use all the software. The ratings that were given for this related to whether the user experience will be less time consuming than the normal day to day business at present.

The technique or tool area

The tools included in this section are the ones that are already available at the council, but not necessarily used, and SharePoint. Other potential tools not used at the council could be included in this house as well which would have addressed issue 2 in section 7.2.

- IBM Content Manager

This application does not provide all the functionality of SharePoint with features such as team sites and people pages not being available. IBM content manager may not offer a package that is as complete as SharePoint but when considering the actual requirements from the initial document management problem it does meet many of them. The search facility is not considered, by the council, to be as good as that of SharePoint and IBM’s product does not automatically fill in the metadata for a document but it does prompt the user to fill it in. Relying on SharePoint to automatically fill this in will not necessarily give the best results.

This application does integrate with the email system used at present in the council, which is Lotus Notes, as this is an IBM product. However, there is no evidence that it has been set up to work like this in the department that the benefit profiling exercise was conducted in. This again shows the lack of management processes being in place and the lack of investigation and understanding of the present systems.

- Google Docs

This is an online solution hosted by Google aimed at business users. It offers a package of features known as Google Apps (Google, 2011) which include features such as calendars, email, contact management as well as document storage. Google Docs is the document management feature and offers the ability to share, store and manage documents online. The search facilities are not as comprehensive as some of the other tools, as Google Docs does not prompt users for metadata or seem to use metadata as search criteria. The document storage area appears less structured than some of the other tools especially SharePoint.

Google requires payment on a per user basis connected to the number of email accounts held by an organisation. Being an online solution, Google Docs would result in less maintenance and equipment costs compared to software hosted by the organisation. Research carried out by Forrester (2011) and advertised on Google (2011) itself showed that it is a cost effective solution and suggested savings of up to third.

- I drives

These are the shared drives that users can access on their own machines. Normally a team will have access to one an area of a shared drive where documents can be stored. The issues with I drives at the council are that documents can only be worked on by one user at a time, they are accessible only from the work place with restricted access and there is no structure to saving, naming or for version control of files.. They offer storage of large amounts of files but have very limited search facilities resulting in users being unable to find files again.

- Paper filing system

This is the main system used at present. There are major filing systems taking up large amounts of floor space in the offices. Archiving of material takes place both in the basements of buildings and also in large warehouses causing delays in retrieving material that is required again. This system has created many of the issues with naming conventions, version control, locating and searching for files.

- Doc Harbor

This application is similar to Google Docs in that it is an online tool that allows capturing, managing, storing and sharing of files. The search facilities are not considered by the council to be very efficient and no extra features are provided beyond managing documents.

The relationship and totals section

This section shows the tools rated against the problem requirements. Google Docs and Doc Harbor are the two online solutions that are used by the council. They show similar results in the ratings and totals sections. Neither tool addresses the issues with version control or help with naming conventions but do offer the best solution to reducing the physical storage space as there would be no hardware storage requirements either. SharePoint and electronic tools hosted by the council would require extra hardware in order to store files and run the applications. This would also entail higher maintenance costs which the council never considered.

The paper filing system scores the lowest of all the tools with the only benefit of using it being that files can be stored. They cannot always be found again and takes up a large amount of the user's time as well as physical storage. Comparing the results to the other tools shows just where the problems with this tool lie.

The barrier basement

The barriers from the Initial Problem House were used in the Alternative Tool House. Except for the paper based system, all the other tools were found to have mainly crosses assigned to them especially SharePoint and IBM Content Manager

(figure 7.3). 'Integration of existing applications' was assigned crosses for all the electronic document management systems tools in the house as it was discovered that at present the electronic tools that were already being used by the council had not been integrated with other systems or databases. The paper filing system was given ticks for integration of existing systems as it simply required either scanning of paper information or data imputing by the user.

The paper based system was the only tool assigned ticks. The culture for the paper system is not a problem as this is the tool users are accustomed too. The only barrier for the paper system is the legal requirements as users seem unaware of exactly what these entail. The legal requirement barrier would be the same for each tool as there were no clear policies in place for users to follow.

The tool connection area (the roof)

This part of the house was not required as the Alternative Tool House analysed the tools independently of each other.

The completed house

Figure 7.3 shows the House of Knowledge Management Tool Selection that has been populated with the other tools that were available at NCC.

		Potential tools					
		Google docs	IBM content manager	I drives	paper filling system	SharePoint	Doc Harbor
Problem Requirements	Rating						
Search/locate files	5	6	8	2	2	10	4
Share files	4	7	9	3	2	9	6
Version control of files	5	1	6	1	0	9	1
Storage of files	4	8	10	9	10	10	8
Naming conventions of files	5	1	1	1	0	2	0
Reduce amount of paper	5	7	8	6	0	6	8
Reduce physical storage space	5	9	8	8	0	7	9
Reduction in printing costs	3	8	7	5	0	8	8
Subtotal +ve		204	252	153	58	270	190
Total		184	228	125	18	246	170
Subtotal: -ve		20	24	28	40	24	20
Cost in time for user	4	5	6	7	10	6	5
Barriers							
culture	Influence	•	✗	•	✓	✗	✗
	overcome	✗	✗	✗	✓	✗	✗
management support	Influence	•	✗	•	✓	✗	✗
	overcome	✗	✗	✗	✓	✗	✗
Legal requirements	Influence	✗	✗	✗	✗	✗	✗
	overcome	✗	✗	✗	✗	✗	✗
Integration of existing applications	Influence	✗	✗	✗	✓	✗	✗
	overcome	✗	✗	✗	✓	✗	✗

Figure 7.3: The Alternative Tool House

7.6.2 Conclusions for the Alternative Tool House

The ratings allocated in the relationship and totals section show that all the problem requirements with the exception of ‘naming conventions for files’ are addressed by many of the tools. This suggests that the naming conventions are part of the problem

that needs resolving by management and not by using a tool to do so. The other problem requirements are resolved by the tools to various extents. The 'storage of files' scores highly with all the tools showing that storage itself is not the issue but actually finding a file again having stored it is fact the problem. Of all the tools evaluated, the paper filing system offers the worst option given the requirements while SharePoint seems to offer the best alternative but this is before taking into account the barrier results of the house.

Some of the features that the tools offer are not seen as part of the requirements, such as disaster management, though this is seen as one of the key features of the online alternatives. Occasionally during initial meetings they were mentioned as nice to have rather than critical, such as accessing files away from the office, but they were not considered a part of the document management problem at the council. Although it would allow users to work from home and offer a safer way of transporting files around, it was never considered as part of the requirements. Back up, disaster management and lower maintenance costs are advertised as some of the major benefits of using online document storage (Doc Harbor and Google Docs) and yet these were not considered as necessary or benefits though disaster management was included following the benefit profiling exercise. These issues show the lack of analysis by the council when considering the knowledge problem initially.

The Alternative Tool House shows that SharePoint would offer the best solution but IBM Content Manager that offers similar features for document management is a close second. Both of these do have issues with the barriers. Considering that the electronic document management tools selected to populate the Alternative Tool House are tools that are already being used at the council, with the exception of SharePoint, all of them show issues with the barriers. This could explain why the present tools are not seen as successful and also suggests that implementing SharePoint is just as unlikely to be successful. The house shows that further research is required by the council to overcome the barriers in order for any IT based tool to be effective at solving the problem.

The Alternative Tool House has addressed issue three by evaluating the tools used at present at the council and allowing SharePoint to be compared as well. The house shows it's flexibility by dealing with the paper based system which is not an IT

solution and being able to evaluate non IT solutions against IT solutions. The literature review from chapter two showed that research in knowledge management tended to focus on IT tools and not enough attention was paid to non IT solutions and the evaluation of these (Ruggles, 1997; Merono-Cerdan et al., 2007).

7.7 Analysis of the Results of the House

The three different houses have evaluated the NCC problem from slightly different perspectives. There were ten issues recognised by the case study and, using the house to evaluate the problem at the council, these issues have been addressed as follows:

Issue 1: only a limited analysis of the initial knowledge problem

The Initial Problem House and the Benefit Profiling House both demonstrated that to complete the problem requirements section and then to be able to rate these requirements required a good understanding of the requirements and highlighted areas that were not completely understood forcing further research. Using the house, therefore, addresses issue one raised by the case study at NCC.

Issue 2 and 3: other potential tools were not considered; tools used presently at the council were not evaluated

The Alternative Tool House was used to evaluate the other potential tools that the council could have considered. Only the tools that were used at the council were included but other tools and techniques could have been included in this house. The house helps to address the issues of investigating all potential tools and techniques whether they are IT or non IT based.

Issue 4: The timing of the business case

The analysis of SharePoint and the associated risks with implementing it was carried out, only superficially, after the tool had been selected. The analysis was only carried out to back up the business case. Using the house has shown that the analysis can be carried out before selecting the tool and a more detailed account of why the selected tool is the most appropriate then included in the business case.

Issue 5: The invention of problems

The Benefit Profiling House shows that the extra problems that were found by the benefit profiling exercise only made a small difference to the outcome of using SharePoint. There were still areas of SharePoint that were not required and some areas that would only have limited use. The completed benefit profiling form did not reveal this as clearly as the house did. The house would not have prevented the invention of problems but would offer a clearer and systematic analysis of them.

Issue 6: poorly defined methodology for selecting a knowledge management tool

Using the house to select a knowledge management tool demonstrates a clear and systematic approach. Each area of the house is systematically evaluated and can be updated as necessary at any time during the process of populating the house. The problem requirements are investigated in more detail as are the tools and the risks. The council's approach was haphazard with the tool selected before a detailed evaluation of the problem and the tool had been undertaken.

Issue 7: a lack of knowledge about the proposed tools

In order to populate the house, SharePoint needed to be understood in more detail than with the council's approach and the house at least would have highlighted just how little of the tool was understood. The first two houses required that SharePoint was broken down into some of its various functions in order to populate the tool and technique area of the house. Further understanding of these function areas is required so that they can be rated against the problem requirements. Throughout the council's approach, a distinct lack of understanding of the tool by both management and potential users was noted.

Issue 8: risks and issues were not analysed

The risk analysis carried out by the council was part of the benefit profiling exercise but no further action was taken once it had been carried out. The house, however, used the results of the risk analysis in the barrier basement part of the house so that they could be assessed against the tools and techniques thus analysing the potential effect of the risks.

Issue 9: a lack of consideration of the users and culture

The complete lack of consideration of the users was shown by the house when evaluating the barriers from The Benefit Profiling House. It was noted that five of the barriers in this house were people related. The ratings given to the barriers showed that they could have a high impact on the tools as well as being hard to overcome. Although the house has not helped solve the lack of consideration of the users it has highlighted the size and importance of the issue and the potential effect it could have on the SharePoint.

Issue 10: a lack of business processes

The house has not solved the lack of business processes that had been found during the case study. The house did show that a process needed putting in place with regards to the naming conventions of files and that no tool was going to solve this part of the problem requirements. This shows that it is a management issue rather than one that required a knowledge management tool.

If the council had used the house to analyse their document management problem a clearer understanding of the problem breakdown, tools and the barriers would have been achieved. The process of populating the house was found to be as valuable as the conclusions reached by the house.

In chapter six, selecting which tools should be included in the house led to the development of the matrix. This was not used as part of the development of the houses in this chapter. The Initial Problem House and The Benefit Profiling House both used features of SharePoint and the Alternative Tool House used the tools already present at the council. This shows the house to be flexible in that it can accommodate tools that are either generic in nature, specific software or even one particular product.

Using the house to evaluate the NCC problem raises the question of whether the barriers should be further investigated. Although the house shows which tool could be affected by which barrier and the ease with which the barrier could be overcome,

the house does not investigate how the barriers could be overcome. This requires further research.

All three houses suggest that SharePoint may offer a solution for the document management problem at the council but that nearly half of the product is unnecessary to solve the problem and that the barriers will prevent a successful implementation.

7.8 Analysis of the Approach Taken by the Council and the House

The differences and similarities in the approach taken by the council and the approach taken by the house were analysed to discover if the house offered a more complete solution. The case study shows the house to be more thorough in its investigation of possible solutions. It offers a systematic approach to selecting and evaluating knowledge management tools given a knowledge problem. This ensures more thorough consideration of all options. Users of the house see a whole picture in diagrammatic form rather than many sheets of printed material trying to explain the scenario. This diagrammatical form allows a manager to better appreciate the barriers and how they could affect the potential tools. It is easier to make changes to the house as it is based on a spread sheet and once set up any changes made to ratings are automatically updated.

Figure 7.4 and 7.5 show the steps involved in the processes used by the council and by using the house to analyse the knowledge problem and select an appropriate tool. From the two process diagrams it can be seen that both of them start with the knowledge problem. The house requires that the problem is broken down into requirements and then rate those requirements leading to a manager needing to understand and research the problem in depth rather than the council's process of merely identifying a problem. The next step for the council was to select the tool. The council's process shows that no research or analysis was done before selecting the tool. Any analysis of tool and problem was done in the form of the benefit profiling exercise and identifying risks for the purpose of placing it in the business case and this was carried out after the tool had been decided upon. No alternative tools were suggested in the business case. The business case was simply used to

secure funding and the benefit profiling and risks analysis were done to tick the box to show they had been thought off as oppose to actually making use of them in selecting a tool.

The process diagram for the house shows that many more steps are taken before deciding on a tool. Tools are analysed against the problem requirements in more detail resulting in a manager having a clearer understanding of the situation and also that a more complete and systematic view of the problems and solutions has been taken. The last step in the process is to select an appropriate tool. The findings from the house could then be used in the business case showing diagrammatically how the tool could address the problem, the potential risks involved and enforcing that the decision has been taken following thorough research.

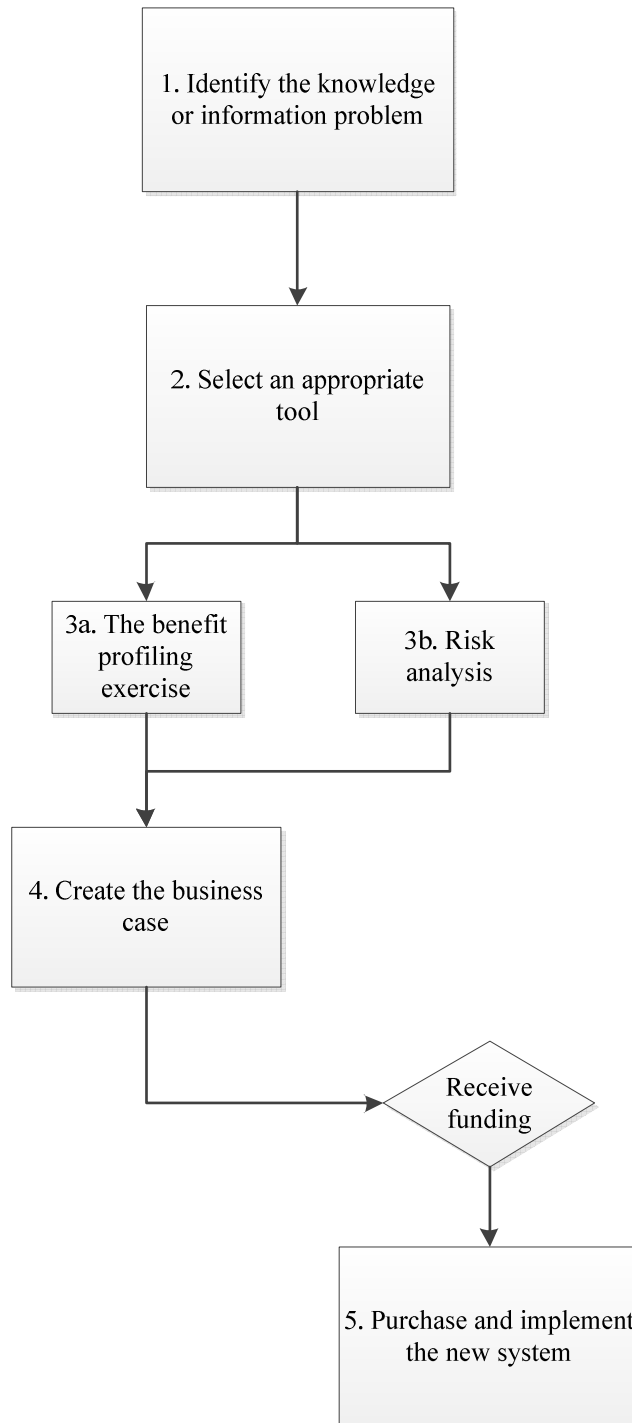


Figure 7.4: The selection process used by the county council

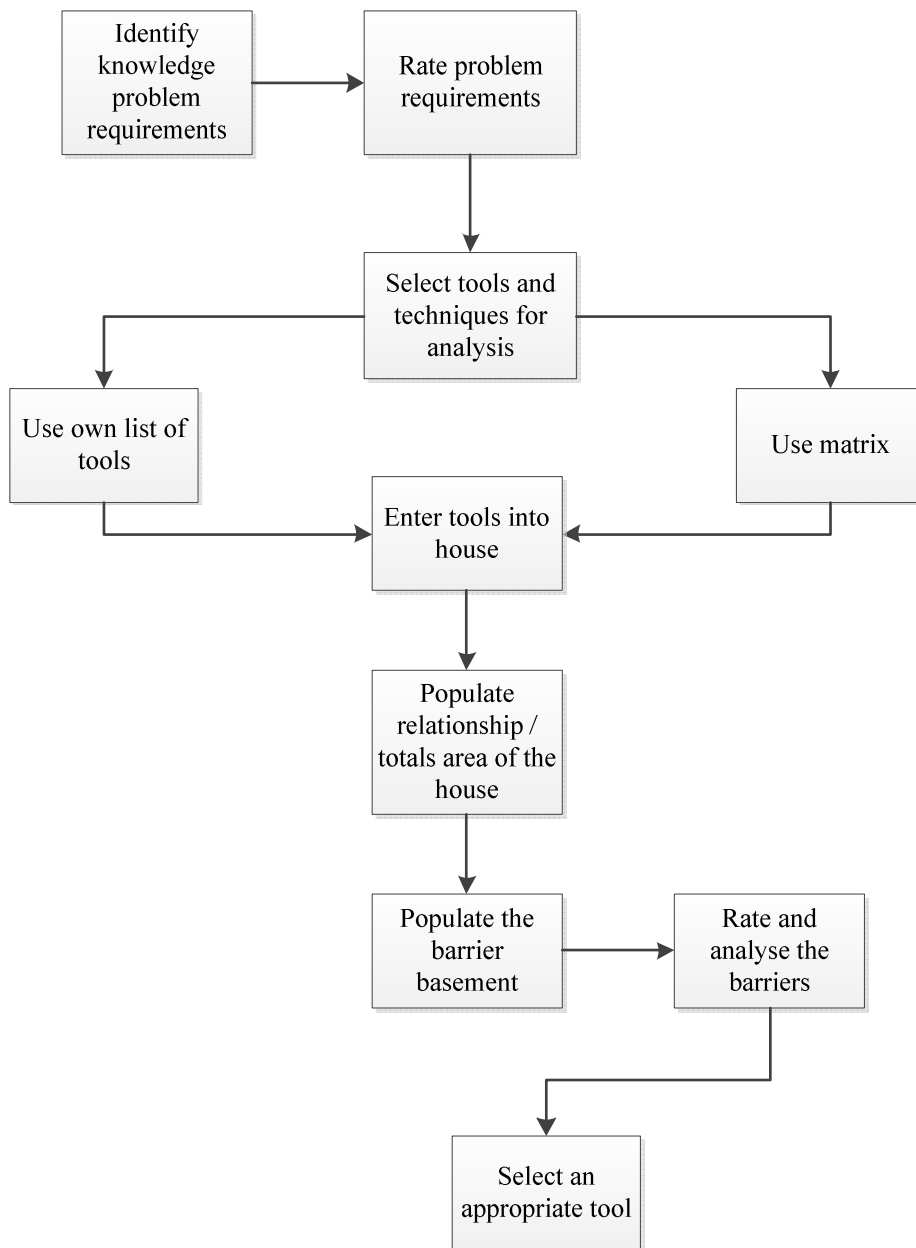


Figure 7.5: The selection process used by the house

7.9 Conclusion

The house has been shown to offer a systematic approach of evaluating and selecting knowledge management tools given a knowledge problem. Objective five from chapter one has been met by carrying out case studies investigating the possible uses of the house in analysing the knowledge problem at the council. The house has been applied to three different scenarios showing it is flexible and that it offers the council more insight into their knowledge problem. The house can be used at various stages

of a project and applied to different scenarios. It can be used to analyse one particular piece of software such as SharePoint or different software products and even analysing these alongside non IT solutions in this case the paper filing system. The case studies have shown that the roof of the house is not always necessary and the roof was found to be fiddly and awkward to manipulate when using excel especially as the house gets bigger. The barrier section of the house could be further developed to find potential ways of overcoming the barriers and the effect these may have on potential tools and the knowledge problem that are being investigated.

Chapter 8

The House of Barriers

8.1 Introduction

Chapter seven used the House of Knowledge Management Tool Selection (HoKMTS) to analyse the knowledge problem at Nottinghamshire County Council (NCC). One of the conclusions drawn from the analysis concerned the barriers. Although the house had the barrier basement area to show how the barriers could affect the tools, by rating them in terms of how much influence the barrier may have on a tool and how easy it would be to overcome the barrier, no further investigation of the barriers was undertaken. The conclusion from chapter seven suggested that further development of the house should include identifying ways of overcoming the barriers and the effect this may have on the original problem requirements and potential tools.

8.2 The Barriers at Nottinghamshire County Council

Three different houses were used in chapter seven to analyse the document management problem at NCC. The first and third house only identified four barriers due to the council not having recognised many risks in the initial assessment of the document management problem. The second house that was developed, the Benefit Profiling House, took into account the results of the benefit profiling exercise carried out by the council which included identifying the risks. This house (figure 7.2) shows that there are twelve potential barriers to consider. The council carried out a risk analysis as part of the benefit profiling exercise but they took no further action in examining the risk analysis. To populate the barrier basement section of the house, the risk analysis was examined and potential barriers to the implementation of SharePoint were identified. The Benefit Profiling House shows that of the twelve barriers that were recognised, many of the barriers could pose a significant problem

to the successful implementation of SharePoint, shown by the many crosses assigned to the barriers in the barrier basement area of the house. To complete the house, the barriers were rated in terms of influence the barrier could have on a tool and how easy it is to overcome the barrier. The house did not show how a barrier could be overcome resulting in the rating assigned to the barrier potentially being based on guesswork rather than being based on analysing potential solutions. The effect of a solution to overcoming a barrier could have on the original problem requirements is not examined either.

The lack of analysis of the barriers by the house raises four issues:

1. How can a barrier be evaluated in terms of whether it can be overcome?
2. What tools or solutions could be used to overcome a barrier?
3. Could one tool or technique help overcome all or many of the barriers or do all barriers require different tools?
4. Does overcoming a particular barrier by employing another tool or technique reflect positively or negatively on the initial knowledge problem or choice of initial tool?

In order to address these issues, the house was further investigated to establish if it could accommodate an evaluation of the barriers and address the issues raised.

8.3 Using the House to Analyse the Barrier Solutions

The house was examined to ascertain whether it could be used to analyse the barriers in more depth and find tools or techniques to overcome the barriers. The first step is to identify the areas that would need to be included in the barrier house, then to decide if the house could accommodate them.

The areas that need to be included in a house that analyses the barriers are:

1. The barriers that are being investigated
2. The tools or techniques that may help to overcome the barriers
3. The original problem requirements in order to determine the effect of introducing new tools on the original problem

4. Ratings for the barriers against the potential tools that will help to overcome the barriers in order to establish which tools or techniques will help to overcome a barrier.
5. Ratings for the original problem against the tools in order to establish what effect they the tools may have on the original problem.

There were five areas in the original house. These were:

1. Problem requirements area
2. Technique or tool area
3. Relationship and totals area
4. The tool connection area
5. Barrier area

The problem requirement area was the area under investigation for which a solution was needed. This will become the barrier area as it is the barriers that are now being investigated. In the first house the problem requirements were rated in order to show their importance. The barriers can also be rated, with the ratings assigned to them reflecting whether the barrier is major problem that needs to be dealt with or a minor issue. The tool or technique area will remain the same though in the barrier house this area will contain tools and techniques aimed at overcoming the barriers. The relationship and totals area will remain the same and will be used to rate the effect tools or techniques could have on the barriers. This area will be completed in the same way as the first house with ratings being given showing how effective a tool could be at overcoming a particular barrier. The 'totals' row will show which tool potentially could be the most useful at overcoming the barriers.

The bottom or basement area of the house accommodated the barriers in the original house. This area will now house the original knowledge problem. This will allow the tools being investigated to be rated against the original knowledge problem. This will help evaluate a tool that could help to overcome a barrier on the effect the tool or technique may have on the original problem.

The roof has not been used in the barrier house but all the other areas of the house have remained the same as the first house. The only changes have been to swap the barriers area with the knowledge problem area. This reflects that the barriers are the centre of the evaluation by the house. Figure 8.1 shows the new layout of the house.

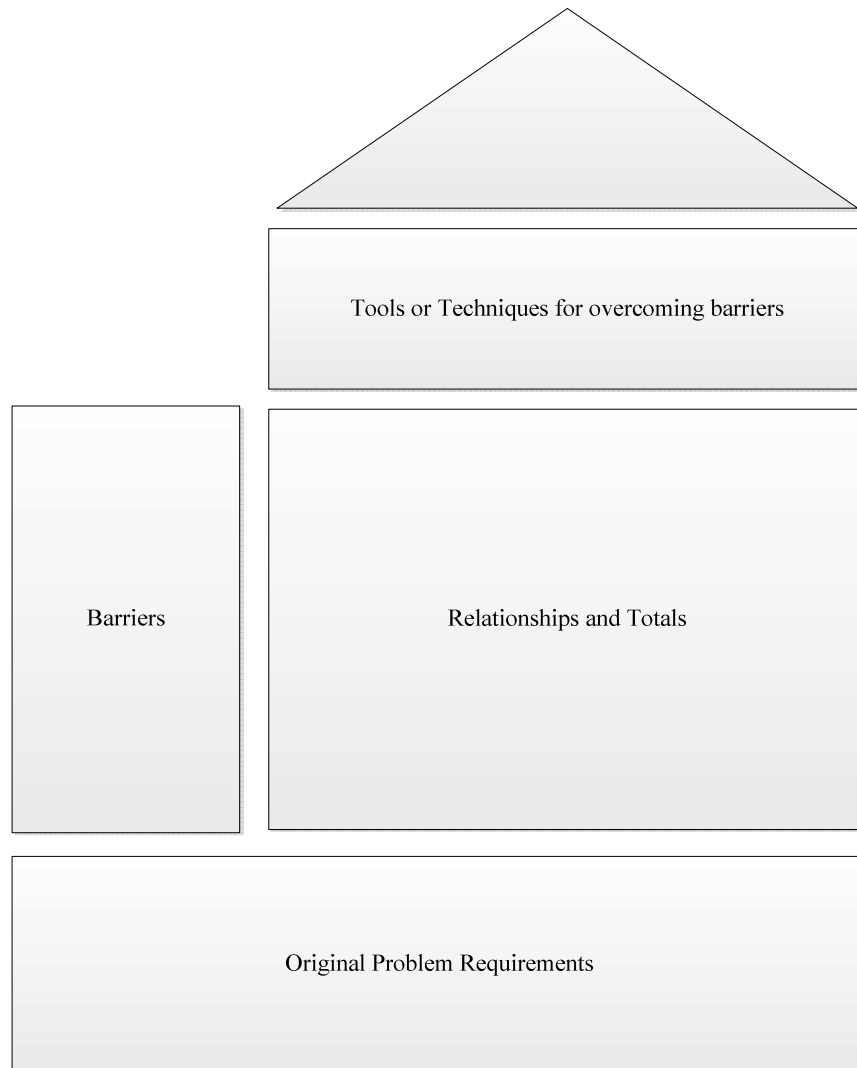


Figure 8.1: The Barrier House

8.4 The Barrier House and Nottinghamshire County Council

The Barrier House was used to evaluate the barriers discovered during the case study at NCC and to determine if tools and techniques could be used to overcome the barriers at the council. The effect these tools may have on the original knowledge problem will also be analysed. The results from this house could then be compared

to the ratings given in the overcome rows for each barrier in the Benefit Profiling House and analysis carried out to examine if the results from the Benefit Profiling House would be altered based on the results of the Barrier House.

The four areas of the house were populated starting with the barriers.

8.4.1 The Barriers

The twelve barriers from the Benefit Profiling House were moved from the bottom of the house to their new position on the left hand side in the Barrier House. In the initial houses focusing on knowledge problems, the knowledge requirements area contained requirements that could have either a positive and negative effect on the success of a solution or tool. For the barrier area in the Barrier House it was noted that barriers could not have this effect on the tools and therefore there are no subtotal rows in the barrier house.

The barriers were then rated in order to show the importance of a barrier. The ratings assigned to the barriers were based on the 'influence' ratings given to the barriers in the Benefit Profiling House. In this house, the influence a barrier could have on a tool was shown by using ticks, dots and crosses as a rating system. For the barrier house values between 0 and 5 were assigned to the barriers. The ticks, dots and crosses needed to be turned into values. The ticks, dots and crosses were awarded according to the following values:

- Ticks: 0, 1
- Dots: 2, 3
- Crosses: 4, 5

Only whole numbers were used for the ratings making it easier to calculate and understand the final results.

The barriers were then assigned a value depending on how many of each symbol the barrier had been awarded in the 'influence' row of the Benefit Profiling House. For instance, 'Training' was awarded a 5 due to all but one of the ratings for influence being crosses. When new IT tools and software are introduced into the organisation,

the interviews carried out with the end users at the council showed that a lack of training was seen as one of the reasons for the limited uptake of the new tools. At the other end of the scale, 'email' was awarded a rating of 1, reflecting the large number of ticks and only four crosses that had been assigned in the influence row. There are twelve barriers and seven of these twelve were given the top rating of five and two were given fours (table 8.1).

Table 8.1: The barriers and ratings area of the Barrier House

Barriers	Rating
lack of Training	5
Culture	5
incentive for user	5
management support	5
business processes	5
IT ability of users	5
help for users	5
Legal requirements	3
Integration of existing applications	2
IT ability of organisation	5
Email system	1
Lack of awareness of tools	4

This shows that the barriers are seen to have a strong influence on the knowledge problem which is reflected in the large number of crosses seen in the Benefit Profiling House. With so many of the barriers being awarded a high rating, the house highlights how influential the barriers could be and the importance of addressing them rather than the approach taken by the council and taking no further action to investigate possible methods of overcoming the barriers.

8.4.2 Tools and Techniques

Whilst populating this area in the original house it was noted that there was no list available to help complete it. This same issue was also noted whilst completing the barrier house. The tools and techniques selected to populate this area were ones

suggested during brainstorming sessions which took place at the council as part of the benefit profiling exercise. Those included in these sessions included the line manager and end users of the potential system. The results of these sessions were used to complete the risk section of the benefit profiling form. A section of the benefit profiling exercise was to ascertain possible risks, their impact and likelihood as well as actions that could be taken. However the council did not investigate these actions or any other part of the risk assessment any further. Other tools were included in the list of possible techniques that had not been mentioned by the council in order to consider all possible tools that could be made available. This included tools such as Twitter or Yammer. Yammer is already available at the council but has limited use.

Lack of training was recognised as a barrier during the benefit profiling exercise. The risk analysis completed during the benefit profiling exercise simply suggested 'provide training' as an action to help overcome the barriers. Further investigation of 'provide training' shows that there are different types of training are available such as online training, seminars and training sessions. The house can be used to consider these potential types of training individually in the tool and technique area of the house rather than under the one heading of 'provide training'. This gives a manager a clearer view of which types of training would be more beneficial given the circumstances of the organisation. Promotion can also be separated into different methods of promotion such as online promotion and the use of posters.

The following tools and techniques were used in the house:

1. Online training: This is training that is available online for the users often accessible through the organisation's intranet. Many of the users at the council, however, are not seen as being IT literate and may be averse to utilising online training. The advantages of online training, however, are that it is seen as cost effective, flexible and convenient for the users as they can work through the training at a time to suit them and at their own pace, it is easily accessible, it is consistent and users can repeat any part if necessary (Young, 2001).

2. Paper manual: Although the organisation is trying to reduce the amount of paper that is used at the council, many users would feel comfortable with a paper based manual to use. This method does have other disadvantages besides increasing paper and printing it will also be harder to keep up to date and alter.
3. Training sessions: training sessions can be both costly for an organisation and time consuming for users. They can give users the chance to use a new system with guidance and become more familiar and confident with the system.
4. FAQs: Frequently Asked Questions (FAQs) are question and answers that users can refer to when needed. The disadvantages are that they need updating and adding to and that the user may not find the answer required, however, the advantages include that they can be made easily accessible to the user and a cost effective option.
5. Twitter/Yammer: Both of these are social media tools. Yammer is already used and available in the organisation but at present not promoted and only used by a small percentage of individuals.
6. Champions: a champion is described by Heng et al (1999) as an individual who makes a decisive contribution to IT innovation by actively promoting the progress of an IT project through the critical stages. Champions are seen as individuals that communicate with users and stakeholders to promote ideas and technologies (Heng et al 1999).
7. Point of contact/ Helpdesk: This technique would give a clear place to find help; however, this can be time consuming for the user if the helpdesk cannot offer a quick solution.
8. Recognition/rewards: Rewards given for using a specific tool as shown by Microsoft offering a computer as a reward to the user for the best completed people's page.
9. Online promotion: Promotion can be carried out online using email, News articles, headlines and banners on the intranet
10. Posters/functions: Posters can be displayed appropriately around the workplace.

11. Create business processes: A lack of business processes was recognised as a barrier to success in the organisation and the only solution would be to create them.
12. Increase management involvement: This is recognised as a key factor to achieving successful knowledge management (Chong, 2005).
13. Invest in Microsoft Outlook or upgrade present email system: There is discontent among users of the present email system that at present the email system is not designed to cope with the users' needs. There are two potential solutions the first being to upgrade the present Lotus Notes system to incorporate the features that are needed or to move to Microsoft Outlook. Including this solution in the house will highlight any other barriers this may help to overcome even though the results of the Benefit Profiling House show that there is little connection between the email issues and the original problem.
14. Seminars: Conference or presentation that provides training and discussion on the chosen topic.
15. Team meetings: These meetings would be attended by a team and the manager giving a chance to exchange views and problems on a range of topics. The disadvantages include being time consuming.

8.4.3 Completing the Main Body of the House

In this area ratings are assigned to the tools showing how well they could help overcome a particular barrier. The ratings used in this area range from 0 to 10 with 0 being awarded if the tool does help overcome a barrier at all and 10 being awarded if the tool would offer a complete solution to the barrier. When assigning these ratings a good understanding of both the barrier and the background behind the barrier as well as the potential tool or technique was needed.

The ratings for the Barrier House were completed by the researcher based on the interview questions asked and observations made during the action research undertaken at the council. For instance, taking into account the nature of the culture in this organisation, paper based solutions and people based solutions are going to

appeal to the users at the Council more than IT based solutions. The ratings awarded to the various tools reflect this throughout this section.

Using Twitter or Yammer as a tool demonstrates that there is a need to take into account that it is IT based and the lack of willingness among staff to use IT solutions. From the benefit profiling exercise it was noted that there is a general resentment about using social networking tools in the organisation as well. However including Twitter as part of the potential tools in the house will show the potential use of the tool. The scores given to this tool reflect this with no score over five being awarded (figure 8.3).

A tool may only have been included in the tool and technique area to specifically address one barrier such as 'create business processes' was included to address the barrier of 'lack of business processes'. The relationship area of the house shows that 'Create business processes' actually helps influence several of the other barriers as well. The ratings assigned to 'creating business processes' show that although this technique helps to address the lack of business processes that were recognised as a barrier by receiving a rating of eight, an eight was also assigned to the barrier 'incentives for users'. This rating was awarded as it was felt that if using SharePoint was part of a business process that users would be more inclined to the tool and understand the value to using the tool. Other barriers that this technique could help overcome include 'Lack of awareness of tools' and 'legal requirements' although lower ratings of three and five respectively were assigned. 'Create business processes' would help with the barrier of 'legal requirements' as an understanding of the legal issues would need to be included in the creation of a business process. Using the house helps to highlight all the barriers that a tool may potentially affect including the ones that had not previously been considered. Figure 8.2 shows the ratings assigned for this area of the house.

		Potential solutions to barriers														
		online training	paper manual	training sessions	FAQs	twitter/Yammer	champions	point of contact/helpdesk	recognition/rewards	Promotion online	Promotion posters, functions	Create business processes	Increase management involvement	invest in outlook or upgrading present email system	seminars	team meetings
Barriers	Rating															
lack of Training	5	3	8	8	5	4	8	8	4	2	4	0	0	0	3	7
Culture	5	0	0	4	3	2	3	2	4	2	3	4	3	3	8	7
incentive for user	5	0	0	2	0	0	1	0	9	1	3	8	5	4	2	5
management support	5	0	0	7	3	0	2	0	5	2	3	6	8	0	6	7
business processes	5	0	0	0	0	0	0	0	0	0	0	8	2	0	0	6
IT ability of users	5	5	8	8	5	3	3	4	5	0	0	0	0	3	0	4
help for users	5	6	9	8	7	4	3	7	5	3	5	0	0	0	4	5
Legal requirements	3	0	0	6	7	5	3	3	0	0	0	5	3	0	5	3
Integration of existing applications	2	0	3	5	6	2	0	4	0	0	0	7	3	5	4	0
IT ability of organisation	5	0	5	9	5	0	0	4	0	2	4	0	3	0	4	1
Email system	1	0	0	3	3	0	0	5	0	0	0	3	0	8	0	0
Lack of awareness of tools	4	6	8	7	7	4	5	0	4	4	7	3	4	0	6	6
Totals		94	188	289	204	100	129	147	176	76	138	174	136	68	182	243

Figure 8.2: Completed main body of the Barrier House

Traditional methods of risk analysis tend to consider each barrier individually and would not necessarily show the influence of a potential solution on other barriers. A clearer understanding of the influence of potential tools and techniques on all barriers would lead to a more selective approach in deciding which potential tools would offer the best overall solution.

The total row is populated using the same method as in the initial house. The rating for the barrier is multiplied with the rating for a tool and all the results for a tool are added together giving the totals.

8.4.4 Populating the Knowledge Problem Basement

In this section the tools and techniques were rated against the original knowledge problem. The tools and techniques being investigated were evaluated in terms of how or if they would affect the original problem. The dot, tick and cross rating method was utilised to complete this area of the house. This method of evaluation was used as it was easier for printing purposes due to it being necessary for printing to be done in black and white rather than the original red-amber-green traffic light method that had been originally used.

The ticks were used to show that the tool would have a positive effect on the knowledge problem, dots would have either no effect or a slight detrimental effect on the problem and crosses would have a strong detrimental effect on a problem.

Examining the ratings that have been awarded in this section most of the tools have received either dots or ticks showing that the tools will either have a positive effect or no effect on the original knowledge problem. 'Seminars', for example, has dots assigned for all but two of the original knowledge problem. A cross was given for 'cost in time to user' as seminars will take time to attend and a tick was given for 'ability to share information across teams'. The tool assigned the most crosses was the 'paper manual'. Crosses were given for the extra paper and printing that would be involved in producing the manual as one of the main focuses of the problem had been to reduce the printing and paper in the organisation.

Overall the tools and techniques for overcoming the barriers were shown to have very little negative effect on the original knowledge problem.

Figure 8.3 shows the completed Barrier House.

		Potential solutions to barriers														
		online training	paper manual	training sessions	FAQs	twitter/Yammer	champions	point of contact/helpdesk	recognition/rewards	Promotion online	Promotion posters, functions	Create business processes	Increase management involvement	invest in outlook or upgrading present email system	seminars	team meetings
Barriers	Rating															
lack of Training	5	3	8	8	5	4	8	8	4	2	4	0	0	0	3	7
Culture	5	0	0	4	3	2	3	2	4	2	3	4	3	3	8	7
incentive for user	5	0	0	2	0	0	1	0	9	1	3	8	5	4	2	5
management support	5	0	0	7	3	0	2	0	5	2	3	6	8	0	6	7
business processes	5	0	0	0	0	0	0	0	0	0	0	8	2	0	0	6
IT ability of users	5	5	8	8	5	3	3	4	5	0	0	0	0	3	0	4
help for users	5	6	9	8	7	4	3	7	5	3	5	0	0	0	4	5
Legal requirements	3	0	0	6	7	5	3	3	0	0	0	5	3	0	5	3
Integration of existing applications	2	0	3	5	6	2	0	4	0	0	0	7	3	5	4	0
IT ability of organisation	5	0	5	9	5	0	0	4	0	2	4	0	3	0	4	1
Email system	1	0	0	3	3	0	0	5	0	0	0	3	0	8	0	0
Lack of awareness of tools	4	6	8	7	7	4	5	0	4	4	7	3	4	0	6	6
Totals		94	188	289	204	100	129	147	176	76	138	174	136	68	182	243
original problem requirements																
Search/locate files		✓	✓	✓	✓	•	•	•	•	•	•	✓	•	•	•	•
Share files		✓	✓	✓	✓	✓	•	•	•	•	•	•	•	•	•	✓
Version control of files		✓	✓	✓	✓	✗	•	•	•	✓	✓	✓	✓	•	•	•
Storage of files		•	•	•	•	•	•	•	•	•	•	✓	•	✓	•	•
Reliability		•	•	•	✓	•	✓	✓	•	•	•	•	✓	✓	✓	✓
Reduce paper		✓	✗	✗	✓	✓	•	•	•	✓	✗	✓	✓	✓	•	•
Reduce physical storage space		✓	✗	✗	✓	✓	•	•	•	✓	✓	•	✓	✓	•	•
Reduction in printing		✓	✗	✗	✓	✓	•	•	•	✓	✗	•	•	✓	•	•
Improving disaster management		✓	✓	•	•	•	•	•	•	•	•	✓	✓	•	•	•
Searchable contact details		✓	✓	✓	✓	✓	•	✓	✓	✓	•	•	✓	•	•	•
Ability to coordinate and view site visits and meetings		✓	✓	✓	✓	✓	•	•	•	•	•	✓	•	•	•	•
Ability to share information across teams		✓	✓	✓	✓	✓	✓	✓	•	•	•	✓	✓	•	✓	✓
Improve response times to customer enquiries		✓	✓	✓	✓	✓	•	✓	✓	•	•	✓	•	•	•	✗
increase scanning		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Figure 8.3: The Barrier House

8.5 Findings from the Barrier House

All the barriers have a variety of solutions that could help the barriers to be overcome. Selecting a few tools or techniques would help alleviate many of the barriers. In examining the tools and techniques selected to populate the house, it can be seen that they have become less IT focused and more people focused. The lower scores found in the totals row of the house all belong to IT solutions. This reflects that the users are not IT orientated but prefer using paper based methods.

All tools will help with more than one barrier as shown by ‘training sessions’ which could potentially affect all but one of the barriers to some degree. Although training sessions has the highest score it also had the most crosses in the bottom part of the house when examining the effect of a tool on the original knowledge problem.

Using the house to analyse the tools lead to tools such as ‘training’ being investigated as ‘online training’ and ‘training sessions’ rather than simply as ‘training’. Evaluating the total row shows that the results for the different types of training yielded different results with training sessions being more favourable than online training and seminars. The results demonstrate that there is a need to consider tools and techniques in detail rather than simply as a general tool.

8.5.1 Resolving the Issues

The case study from chapter seven raised four issues involving the lack of analysis of the barriers. The first issue was concerned with how a barrier can be evaluated in terms of whether the barrier can be overcome. The house addresses this rating the potential tools and techniques against the barrier showing if they can help overcome a barrier. The barrier house as a whole examines whether a barrier can be overcome, although no total column was given for each barrier row. Examining the rows for each barrier individually shows that there a variety of methods that could be employed.

The second issue raised concerns of how a barrier could be overcome. This was addressed by the house by examining which tools and techniques could be used to

overcome a specific barrier. Using a rating system showed how effective a tool might be in overcoming a particular barrier.

The house addressed the third issue by evaluating the tools and techniques that could be used against all barriers. Although no one tool would be effective against all the barriers, the Barrier House did show that the tools could help with more than one barrier to either a greater or lesser extent.

The bottom area of the house was used to address the fourth issue that was recognised during the case study at the council. The tools and techniques were examined to ascertain the affect they may have on the original knowledge problem. Ratings were assigned to the tools in relation to how they may affect the original knowledge problem.

8.5.2 Which Tools could the Council Use

Table 8.2 suggests the tools NCC could use to help overcome the barriers. No one tool has the potential to overcome all the barriers; therefore, a combination of tools is required to take into account all the barriers.

Table 8.2: Tools to use to overcome barriers

Yes use	Possibly use	Don't use	Reason
		Online training	Overall low total score especially when compared to all the possible training methods. IT based solutions are not going to be popular with the users.
Paper Manual			Being paper based will be popular and easy to use within this organisation. Although the tool did incur more crosses in the bottom section of the house.
Training sessions			Highest total result and would positively affect nearly all the barriers. This tool does have the most crosses.

Yes use	Possibly use	Don't use	Reason
FAQs			Although this tool does not score particularly high in any specific area it does address many of the barriers. It is also cost effective
		Twitter/ Yammer	Low total result and IT based which will not be popular. Yammer is already available in the organisation but not used to a great extent.
	Champions		NCC favours using this method but has not had previous experience in their use. The total results are not convincing with low ratings and the tool having little effect on the original knowledge problem.
	Helpdesk		Very similar results to the Champions above. This tool has little influence on the original problem and received low ratings.
	Recognition/ rewards		This tool addresses one particular barrier and would depend on which other tools may be employed as to whether this one would be necessary.
		Promotion posters	Examining the ratings it can be seen that the results this technique offer can be achieved by using other tools that would also offer other benefits and not be so limited in the number of barriers they could help with.
		Promotion online	As above
Create business processes			Although slightly lower total result, this is the only tool or technique that helps to overcome the lack of business processes in the organisation and therefore needs to be used.
	Increase management involvement		This tool could be used later on if it is found to still be necessary, but would not be a first choice tool.

Yes use	Possibly use	Don't use	Reason
Team meetings			High total result though not many ticks and a couple of crosses as well in the bottom section of the house.
	Seminars		Although has the same total score as the paper manual tool, it has little effect on the original knowledge problem. There is also a need to balance how many tools are required to overcome the same barrier.
		Invest in Outlook or upgrading present email system	This has the worst total and affects the fewest barriers of all the tools.

Table 8.2 shows the selection of tools that could be used to overcome the barriers. Analysing the results in the table ensured that consideration was given to exactly which barriers the tools would help to overcome. The analysis shows that although some tools would seem a good idea, such as using posters, the barriers that these would address could be achieved by using other tools that would also offer more benefits elsewhere. Other barriers could only be overcome to any extent by using one specific tool, such as lack of business processes being overcome by creating business processes, suggesting that this tool should be used even if the benefits of using it would be more limited.

The table demonstrate that the choice of tools needs to be balanced between those that offer the best solutions to overcoming barriers and those that need to be used to overcome one specific barrier because no other tool could address it. Although the results row from the Barrier House is useful, selection of appropriate tools cannot be based on choosing the top scoring tools and techniques. The table could be introduced in meetings to promote debate on selecting tools and help to create discussion and clarify ideas surrounding the barriers and the tools.

8.6 Applying the Findings from the Barrier House to the Benefit Profile House

The results provided by the Barrier House were investigated to see how they could be applied to the Benefit Profiling House and to ascertain how they would influence the results in the original house.

The results from the barrier house could be used to populate the overcome rows of the Benefit Profiling House. Although the ‘overcome’ row was completed first during the case study at the council, the results could be compared. This shows that there are two ways in which the barrier house could be used:

1. Populating the Barrier House and investigating the barriers in more depth before completing the ‘overcome’ rows of the barriers in the first house
2. Completing the first house completely including the barrier section and then investigating the barriers using the Barrier House. The results of the Barrier House could then be compared to the initial house.

In the NCC case study, the barrier section of the Benefit Profiling House has been completed with both the ‘overcome’ and the ‘influence’ row. The results of the barrier House could, therefore, be compared to the ‘overcome’ ratings assigned to the barriers in the original house. Assigning ratings to the barriers in the Benefit Profiling House based on the Barrier House would depend on which tools or techniques from the barrier house it was intended to use.

Two ways of utilising the results of the Barrier House were found:

1. Investigating the barriers by looking across the barrier rows helps to ascertain if there are tools and techniques available to overcome a barrier.
2. Investigating the tools and techniques by looking down the tool columns showing how effective a tool may be at overcoming a variety of barriers and the effect it may have on the original problem.

The first way the house can be used is to look at the results across the barrier rows and apply the findings to the 'overcome' rows in the Benefit Profiling house. In general, inspecting the barrier rows, it can be seen that the barriers have various tools and techniques that will help to overcome them. Examining the 'culture' barrier row in more detail, the ratings given to the tools and techniques show that all the tools except for two out of the fifteen investigated could help overcome culture as an issue. However, considering the ratings that were awarded to the tools, ratings of four or under were given except for 'seminars' and 'team meetings'. This shows that although many of the tools will help to some degree with overcoming culture as a barrier, none of the tools provide a clear way of overcoming the barrier. From the literature review in chapter two, culture is recognised as a main barrier to the success of knowledge management initiatives and one of the hardest to overcome. Comparing these findings from the Barrier House to those in the Benefit Profiling House, culture was assigned crosses for nearly all the overcome ratings and the Barrier House reinforces the ratings that were originally given.

Another barrier being investigated was lack of training. Examining the row across for this barrier, shows that training can be overcome using a variety of tools ranging from paper manuals to training sessions and the use of champions. The ratings given show that employing a tool to overcome this barrier should successfully overcome this barrier. In the Benefit Profiling House the overcome row for this barrier was assigned crosses all the way across. These crosses could be changed by employing some of the suggested tools; however, the ratings could only be changed if the tools were actually used by the council.

The Barrier House shows how barriers can be overcome and the tools and techniques that could potentially be used could alter the large number of crosses that were originally assigned to the barriers leading to a more successful implementation of SharePoint.

The second way in which the results from the Barrier House could be used is by going down the columns of each tool. This would allow for the tool to be examined on how it could affect all the barriers and the original knowledge problem as well.

The tool with the highest total was training sessions (fig 8.3). This tool has high ratings for many of the barriers with only one rating of zero and over half the other ratings being over five. This tool would help overcome several of the barriers. Examining the effect of this tool on the original knowledge problem at the bottom of the house shows that a total of four crosses were assigned which is the highest number of crosses for all the tools considered. The organisation needs to consider whether the benefits of using the tool would outweigh the detrimental effect the tool may have on the original problem. Although this outcome would affect which tools are selected to overcome the barriers and does need considering, it does not directly feed back into the Benefit Profiling House.

There is no clear and concise way of using the results from the Barrier House to help populate the overcome row in the Benefit Profiling House. It has been shown that there are two methods of using the Barrier House in order to better understand the barriers and the tools and techniques that could be used to overcome them. Comparing the results of using the house to understand the barriers and the results from carrying out the risk assessment at the council the house offers an in depth evaluation of the barriers and the tools to overcome them whereas the risk assessment carried out at the council did not provide the same depth of analysis.

8.7 General Findings from Populating the House

The house proves itself a useful tool, encouraging managers to consider a variety of tools and techniques in more detail and in relation to all the barriers, the original problem and all potential tools and techniques. In order to populate the house, the manager or those populating the house, need a clear understanding of the barriers and the tools and techniques that could be used. The techniques that were analysed in the house were more specific than had been included in the risk analysis that was carried out by the council. 'Training', for instance, was investigated by evaluating different types of training, as was promotion. The format of the house allowed for tools and techniques to be investigated in more detail, as well as being able to add or alter tools as work on populating the house was carried out. Tools that would not have normally been considered, such as Yammer, could easily be included and evaluated and the

results compared to the more favourable tools. This highlights the flexibility of the house in evaluating all possible tools. Using the house to investigate the barriers allows for all potential tools and techniques to be considered as solutions for all the barriers and not limiting potential tools to those that are expected to be appropriate.

The results from the barrier house can be used to either help complete the overcome row in the knowledge problem house or to consider how employing the tools to overcome the barriers would affect the results of this row in the Knowledge Problem House. Altering the results of the Knowledge Problem House would not be done unless the tool or technique from the barrier house was actually going to be used, however, the design of the house would allow for 'What if' scenarios to be carried out to see the potential effect of using a tool or technique. The results reached in the Barrier House for NCC are particular to this organisation and at this time. Another organisation with a similar knowledge problem will not necessarily find the same tools and techniques to be useful. As the house has shown, it depends on the users' abilities and the organisational culture as to what ratings are assigned at the various stages of the house development.

8.8 Conclusions

The barrier house provides a systematic approach to evaluating the barriers and the potential tools that could be employed to overcome the barriers. Using the barrier house, in the case of the council, ensures a more in depth investigation into the barriers and the tools is undertaken. Utilising the house ensures that a risk analysis that has been carried out is not simply done as an exercise and then ignored, as in the case of NCC, but that risks and barriers that have been recognised are further investigated. The issues that were raised during the initial case study in chapter seven were addressed by the barrier house in this chapter. A better understanding of the underlying issues of the organisation was also highlighted, such as the email system, the lack of business processes, and the lack of confidence and ability of the users in IT.

The houses and the results obtained from the council were not discussed with them. It was hoped that the results from the houses could be compared to the results found by the council once SharePoint had been implemented. This would have shown how accurate the results from the houses would have been in relation with the actual outcome at the council. However, the timescale of the research and the length of time taken by the council to implement SharePoint resulted in this not being possible.

The results from the house could have been fairly confrontational as the houses showed that the approach taken was potentially not the most effective way of approaching their document management problem.

Further case studies could be carried out to demonstrate if the tools or techniques that are used to populate the house remain the same or similar given different scenarios and barriers.

Chapter 9

ASTRAZENECA AND THE GRID

9.1 Introduction

Chapter five investigated the knowledge management tools at AstraZeneca. The interviews carried out discovered the tools being used and how knowledge management has developed in the organisation leading to the strategy presently being pursued. This chapter uses the Knowledge Management Tool Grid developed in chapter six to analyse the tools that were discovered by the case study at AstraZeneca. The findings from the grid are then compared to the company's knowledge management strategy. This develops further understanding of the connection between the readiness and stage of development of knowledge management in the organisation and the selection processes and success of the knowledge management tools used by the business. The results from the first Knowledge Management Tool Grid used in Chapter five and the AstraZeneca Knowledge Management Tool Grid developed in this chapter are compared to ascertain if the same tools appear in each grid and if they occupy the same position in each grid and to analyse what this indicates about the company.

9.2 AstraZeneca Tools and Strategy

The interviews carried out at AstraZeneca investigated what knowledge management tools were being used, how the tools were selected and how successful the tools were. To complete the Knowledge Management Tool Grid, an understanding of the purpose of each tool is required and how the organisation actually uses each tool.

A total of nine knowledge management tools were discovered during the interviews at AstraZeneca. Table 9.1 shows the tools and what they are used for according to the interviewees.

Table 9.1: AstraZeneca knowledge management tools

Tool	Usage
Wiki	The main reason for introducing this tool was to allow the users to share knowledge and be able to find the knowledge when required.
Yammer	This tool is described as an ‘Enterprise social networking tool’ and is used to share knowledge and improve communication throughout the organisation.
Epistine	A decision making tool that never went live due to high costs.
SharePoint	An initial attempt to introduce this tool in a small area failed. However, a project to introduce the tool across the organisation to aid knowledge sharing is being investigated.
Library on Legs	This was a list of subjects and contact details of an expert in that area. This tool failed but the reason is unclear.
Company Intranet	This was only mentioned in one of the interviews as a KM tool, with people pages being the most used area of the site, though issues with the search facilities were also mentioned.
Tool-with-No-Name	<p>This tool was designed in-house to specifically meet certain criteria. These were:</p> <ul style="list-style-type: none"> • Searching for knowledge • Validation of knowledge • Knowledge sharing • Storage or signposting of knowledge
Knowledge Network	These knowledge networks are face to face meetings in order to share ideas at a local level.
Document management systems	These are storage systems that the interviews showed had issues with finding documents stored in them.

Not all the tools mentioned above are being used at AstraZeneca today. Epistine never went live and Library on Legs failed to be used as well. SharePoint was mentioned in two instances one of which failed but the tool was also mentioned as being part of a new initiative, being introduced by management across the organisation. The other tools mentioned are all being used regularly.

The only tool to be described as successful was the Tool-with-No-Name with both the 'Wiki' and 'Yammer' being describe by the interviewees as useful, though all three are considered to be relatively new tools.

The interviews discovered that AstraZeneca have not had a knowledge management strategy in the past. The organisation focused on the Research and Development area of the business and has only recently recognised the need and the benefits to be gained from knowledge management. Their knowledge management strategy now focuses on knowledge sharing with projects such as 'learning from experience'. The interviewees felt that, previously, the business had not been ready to develop knowledge management initiatives due to a lack of IT ability and a lack of a sharing culture.

9.3 Knowledge Management Tool Grid

In chapter six the Knowledge Management Tool Grid was developed to aid managers complete the tool section of the house. An initial small case study used to test the house found there was no list of tools that a manager could refer to when populating the tool area of the house. The Knowledge Management Tool Grid was created in order to address this issue. This ensured that the managers considered all potential tools and did not limit the tools investigated.

The tools were classified in terms of their ability to address specific knowledge problems. They were then placed in one of three categories within each knowledge problem type, depending on the tools use.

In the case of AstraZeneca, the grid was used in a different way from that originally intended. The layout of the grid remained the same, however, only the tools discovered during the interviews were used to populate it. All these tools were

analysed irrespective of whether they are being used or not. This was to highlight areas of knowledge management problems that the business addresses and those knowledge problem areas that either the business feels are not a problem or have not acknowledged as a problem. This helped analyse the tools that were used and how these aligned with the knowledge management strategy that the organisation follows. Both the first grid and the AstraZeneca grid could then be compared, in terms of where the tools were positioned within them and whether all the AstraZeneca tools appeared in the first grid, and an analysis of what this indicates about the company culture and approach to KM.

9.4 Populating the AstraZeneca Knowledge Management Tool Grid

To populate the grid, all nine tools were included irrespective of whether the tool was still being used or not or whether it was successful or not. Where a tool was placed in the grid was determined by the responses from the interviews that had been carried out and not on where the tool was placed in the initial grid described in chapter six or where the tool might be expected to be placed according to literature or software product guides. An example of this would be SharePoint, which is marketed by Microsoft as having searching and storage facilities; however, those interviewed never mentioned these as a reason for using SharePoint. SharePoint was seen purely as a platform that would allow knowledge to be shared and transferred. SharePoint was, therefore, only entered in the grid in these two categories (Table 9.2). During the interviews the interviewees were not prompted about what the tools were used for or how they use them. It is, therefore, possible that those interviewed overlooked some of the more obvious uses of the tools for instance SharePoint being used for its searching or storage capabilities, which Microsoft describe as one of the main functions of the system.

The Tool-with-No-Name appeared in several of the knowledge problem areas with four entries in the main purpose category and two further entries on the added bonus area. The tool was described in detail by the interviewee with the main functions of

the tool being to store knowledge and to be able to search for and find it, again allowing it to be reused. A validation system had been put in place to ensure that the documents were up to date and the details of the owner of the documents were also available. This meant the tool was added to the ‘added bonus’ section of both ‘source signposting’ and ‘validation’ areas of the grid.

There were three document management systems being used at AstraZeneca with the main use of them, unsurprisingly, being storage. The interviews showed, however, that users could not always find documents again, indicating that the search facilities were not effective. This tool type, therefore, got placed in the ‘not guaranteed outcome’ area of the ‘search’ knowledge problem.

From Table 9.1, Knowledge Networks are used to share knowledge. The main purpose of the tool was collaboration and sharing but the tool was not placed in the Tacit-to-Explicit column as these were face to face meetings and no notes or records were made. Knowledge networks was placed in the ‘added bonus’ section for ‘creation and innovation’ as the tool was expected to bring together workers with the same interests and help discover new ideas but did not guarantee this outcome.

From the interviews ‘Wiki’ is seen as a tool to facilitate knowledge sharing. The tool encourages users to share their knowledge, transferring tacit knowledge to explicit. The tools main purposes for the grid are, therefore, ‘Tacit to explicit’ and ‘Collaboration and sharing’. Validation of the knowledge entered into the wiki can occur if another user comments or adds to the page but it is not a guaranteed outcome.

From table 9.2 it can be seen that Yammer has very similar positions in the grid as Wiki. For validation, again, Yammer has been placed in the not guaranteed area due to the reliance of another user responding or commenting on the original input. The main differences between the two tools are that wiki is considered to have storage as an ‘added bonus’ but Yammer has not.

The Intranet was mentioned during the interviews in relation to the skills and links database as the most used area of the intranet. As such, the intranet was only placed in three areas of the grid, as the grid was completed based on the results of the interviews. The Intranet was placed in the ‘not guaranteed’ area of the ‘search’

column due to the interviewees mentioning that it was not always possible or easy to find what they were looking for using this tool.

Table 9.2: AstraZeneca Knowledge Management

	Source Signposting	Search	Creation/ Innovation	Validation	Storage	Transfer/ Distribution	Collaboration/ Sharing	Tacit to Explicit	Decision Making	Representing/ Analysing
main purpose of the tool	Library on Legs	Tool-with-No-Name			Document management systems	Tool-with-No-Name	wiki	Tool-with-No-Name	Epistine	
					Tool with no name	Intranet	Yammer	Wiki		
						SharePoint	COPs/ knowledge networks			
							SharePoint			
added bonus that the tool provides	Intranet (skills/links database)		COPs/ Knowledge networks	Tool-with-No-Name	Wiki	Yammer		Yammer		
	Tool-with-No-Name									
not a guaranteed outcome.		Document Management systems		Yammer		COPs/ Knowledge networks				
		Intranet (skills/links database)		Wiki						

9.5 Analysis of the Results

From table 9.2 it can be seen that not all knowledge problem areas are populated. For instance, ‘representing and analysing’ has no tools at all and ‘decision making’ has only one tool which never went live. Only five out of the ten problem types have tools in the ‘main purpose’ area if only the tools that are actually being used at AstraZeneca are taken into account. This shows that knowledge management activities are concentrated in specific areas. The grid shows that ‘storage’, ‘transfer/distribution’ and ‘collaboration/sharing’ would be considered to be the main areas of activity with ‘tacit to explicit’ and ‘search’ being areas of knowledge management that are done to a lesser extent. The results from the grid show that certain potential knowledge problems are not considered problems at AstraZeneca at present, indicated by the lack of tools in those areas

9.5.1 The Knowledge Management Strategy and the Grid

The knowledge management strategy at AstraZeneca is now concentrating on sharing knowledge and being able to reuse this knowledge. From the position of the tools in the grid, it can be seen that the main knowledge problem areas that the tools are addressing are knowledge sharing and storage. This suggests that the strategy that AstraZeneca is pursuing is already being followed to a certain extent. At present, however, there are a lack of tools in the ‘search’ problem type and ‘validation’ problem type. This reflects the stage that the business is at in terms of development of KM strategy.

Having stored knowledge, in order to reuse that knowledge, there needs to be appropriate search facilities in place. Validation is also necessary to ensure knowledge is up to date and fit for purpose. The Tool-with-No-Name has been developed taking into account these issues but no mention of this was made with any other tool during the interviews and the grid shows that no tools are focussing on these areas. This reflects the early stage AstraZeneca is at with regards to their knowledge management strategy. The business has concluded that it needs to share and store knowledge but has not progressed onto validating and searching in order to be able to make better use of that knowledge at a later date. This suggests that there

are clear stages in the development of knowledge management in an organisation and that AstraZeneca's knowledge management strategy will need further development in the future.

9.5.2 The Grid and the Organisational Culture

The grid offers a better insight into the culture at AstraZeneca. The interviews did suggest that in the past employees at the organisation were not willing to share knowledge but the tools that are now being introduced and used suggest that this is changing. Management seem more aware of the need to share knowledge and the grid can be used to show managers the available tools and any gaps that exist. The grid could also be used by new employees to indicate the tools and the culture of the organisation.

AstraZeneca's core business is the research and development of drugs which could be assumed to need the company to have strong innovation skills. The tool grid shows, surprisingly, that only one tool is found in this problem area and even then it is not the main purpose of that tool. Although unexpected, this finding is in agreement with earlier research by Parsons (2007) who found that, while AstraZeneca depended on innovation, it was not an innovating company itself but rather it built its success by buying in and developing the innovation ideas of other organisations.

9.5.3 Grid Result Conclusions

The grid may be simple in design but it has been shown that it can be used to analyse the knowledge management tools that are being used at AstraZeneca. The grid has highlighted the areas of knowledge management that are used in the organisation as well as those that are not. This can then be compared to the KM strategy in place in the business, showing where the gaps are and where there is a large concentration of tools. The analysis of the results from the grid show that further development of KM at AstraZeneca could focus on the searching and validation of knowledge in order to be able to reuse it more effectively. If the organisation feels that more tools are required for sharing knowledge then an in-depth review of the tools already used

should be carried out to ascertain if the tools are effective and what functionality a new tool needs to be effective.

From the case study it can be concluded that the grid is flexible and can accommodate any type of tool, either IT or non-IT and that tools are easy to add to as necessary. The grid shows that tools do not necessarily need to be IT based to be used by an organisation. Knowledge Networks at AstraZeneca are an example of a non-IT based tool, however it is the only one mentioned, showing the predominance of organisations to use IT based tools.

The grid requires those who are populating the grid have a thorough understanding of the tools involved and the knowledge problems they are being used for in the organisation. It would be very easy to complete the grid by placing the tools where they are expected to be rather than how they are actually being used in the organisation.

9.6 Analysis of the Grids

The results from the first Knowledge Management Tool Grid completed in chapter six were compared to the AstraZeneca Knowledge Management Tool Grid that has been developed in this chapter. The positions of the tools in both grids were analysed to see if the same tools were present in both grids and if the tools were in the same positions. Each tool was analysed in turn.

- **Wiki**

This tool was found in both grids with the main purpose of the tool being knowledge sharing. AstraZeneca did not consider 'storage' as a feature of the tool, only an added bonus.

- **Yammer**

This tool was not included in the first grid. Yammer was described as a Twitter-like tool, but Twitter was not included in the first grid either and, potentially, could be

added to it as a result of the increase use being made of social media type tools in the work place (AIIM International, 2008).

- **Epistine**

This is not in the original grid.

- **SharePoint**

SharePoint was not included in the first grid but again could potentially be added to it.

- **Library on Legs**

This tool did not feature in the original grid though does show some similarities in the purpose of the tool to Expert Directories which was included in the first grid. Comparing these two tools shows that they occupy the same places in the grid for ‘Source Signposting’ and ‘Storage’.

- **Intranet (skills/links database)**

The intranet was not included in the first grid. The main area of the intranet used at AstraZeneca was the skills database which resembled people pages. These are links enabling the user to find experts. ‘People pages’ was included in the first grid. Both grids have this tool for source signposting, but only as an added bonus for AstraZeneca due to it being part of the intranet and not the main use of the intranet.

- **Tool-with-No-Name**

This tool was not in the original grid and could not be compared to other similar tools as it is custom made by AstraZeneca to meet their knowledge problem needs.

- **COPs/ Knowledge networks**

This tool occupied the same position for both grids except for the ‘Transfer and distribution column. When completing the original grid, it was assumed that the COP would be online and as such offered the ‘added bonus’ given to the tool for this

knowledge problem. However, at AstraZeneca, the knowledge networks are carried out in meetings either face to face or over the phone. This resulted in COPs being placed in the 'not guaranteed' section. This difference shows the need of a clear understanding of the tools being investigated by those populating the grid.

- **Document Management Systems**

The interviews revealed that the document management systems used in the organisation were not considered to have good search facilities, which was an issue also highlighted by the case study at Nottinghamshire County Council. This resulted in the differences in positioning between the two grids in the 'Search' column with the original grids suggesting it was an added bonus but the AstraZeneca grid suggesting it was not a guaranteed outcome. The first grid potentially reflects a more theoretical view of what a tool is expected to be able to do rather than the practical view of the tool being used in industry.

9.6.1 Conclusions from the Grid Comparison

Nine tools were used to populate the AstraZeneca grid with only five of those tools having been used in the original grid. This shows that the grid needs to be flexible and that users can add new tools as they are found or, in case of Twitter, as they become more popular. Some of the tools not found on both grids were in house tools created specifically by AstraZeneca, others simply had not been thought of when completing the initial grid. This demonstrates that a grid cannot be developed to contain all knowledge management tools as they will differ from one organisation to another. Tools can also be considered by a general name or a product name such as 'document management system' or 'Documentum', again leading to different positions within a grid.

Tools that occupied different positions in the two grids, such as Document Management Systems, shows that the analysis of the tools in the organisation is an important step to understanding how tools are actually being used and can reflect the culture of the organisation and the stage of development of the knowledge management strategy.

The Grid helps to show which tools are maybe not being used to their full potential and tools that are being used in ways that were not planned or expected.

9.7 Conclusion

The Knowledge Management Tool Grid may be simple in design but shows that it can be used to analyse knowledge management tools that are already being used in an organisation. The grid is a versatile method of analysing knowledge management tools by investigating which knowledge problems they are being used to address. The results from the grid can then be compared to the knowledge management strategy of the organisation to see if there are any discrepancies between the two. This allows an organisation to understand what tools they have and which knowledge problems are being addressed. The grid can also be used to show how effectively knowledge problems are being addressed and the effectiveness of the knowledge management strategy.

The grid also reflects the state of maturity of knowledge thinking and the company culture. This could lead to the company reforming the knowledge strategy based on the knowledge gaps identified and the underuse of the knowledge tools. A more systematic approach to knowledge management is introduced by the utilising the grid to analyse the knowledge tools of an organisation.

The grid was developed eighteen months after the interviews had taken place and the results of the grid were not shown to the interviewees. The grid was completed by the researcher based on the results of the interviews. Had the grid been developed before the interviews were carried out, more specific questions could have been asked regarding where each tool mentioned would have been placed in the grid by the interviewees. Face to face interviews would have potentially yielded an easier and more productive result as the interviewees would have been able to see the layout of the grid making easier to decide where tools could have been placed.

Although the grid was not originally designed for this purpose this case study has shown an alternative and effective new use for the Knowledge Management Tool Grid for the evaluation of strategy and culture within an organisation.

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Appendix A: Benefit Profiling Form

Benefit Profile

Programme	
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Responsible Officer	Service Area	Reference

Programme or Organisational objectives supported	
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Description of Benefit or Dis-Benefit	Measure to be applied	Timescale for Realisation	Type of Benefit

Current / Baseline performance levels	Improvement / deterioration expected	KPIs affected

Benefits that this benefit depends on	
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Cashable Benefit Value	Costs associated with the delivery and measurement of the benefit	Other Benefits that this contributes to	Dependencies on other programmes / projects



Appendix A: Benefit Profiling Form

Benefit Profile

Risks Identified	Likelihood	Impact	Action

Risks Identified	Likelihood	Impact	Action

Appendix B: Completed Benefit Profiling Form

Programme	
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Responsible Officer	Service Area	Reference

Programme or Organisational objectives supported	
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Description of Benefit or Dis-Benefit	Measure to be applied	Timescale for Realisation	Type of Benefit
<p>Benefits</p> <ol style="list-style-type: none"> 1. Searchable Document Storage: Requires naming convention and indexing system. This will reduce time spent searching archives or waiting for documents to be returned from archives. 2. Record management: ability to manage the lifecycle of stored documents and control over their security. 3. Reduced filing time: One area to file in and no printing out of paper copies. Less likely to loss files completely. Does need a structure and process to be included. 4. Quicker collation of Information: Easier and quicker to find documents if all in one place. 	<p>Benefits</p> <ol style="list-style-type: none"> 1. Cost associated with time taken to search for documents and time spent waiting for documents to return from archives. 2. ? 3. Cost associated with time spent filing. Cost of losing documents which has resulted in an out of court settlement costs.(unknown cost) 4. Time associated with collating information for inquiries. 5. ? 6. Cost savings made in paper and ink. Reduction in time spent printing. 7. Cost associated with time taken to recover documents. Risk to losing 	<ol style="list-style-type: none"> 1. Immediately, though searching archives would be long term. 2. Long term 3. Immediately for new files 4. Immediately for new cases that have moved to electronic storage. 5. Immediately for new files 6. Progressively over time as new way 	<ol style="list-style-type: none"> 1. Cashable, intangible 2. Intangible 3. Cashable and intangible 4. Cashable 5. intangible 6. Cashable, tangible 7. Cashable, Intangible 8. Cashable, tangible 9. Cashable, intangible 10. Cashable, Intangible 11. Cashable

Appendix B: Completed Benefit Profiling Form

<p>5. Reduced duplication of Documents: If documents are all in one place, everyone can access them instead of retaining their own copy on their own machines. Version control. Process is needed.</p> <p>6. Reduced printing: Reduction in both time spent printing and the amount that is printed. (At present emails are printed out in full as there is no where to easily store them.)</p> <p>7. Improved Disaster Management: Decreased risk of loosing paper files due flood damage (or fire). Some files are sole copies and others would be hard to replace.</p> <p>8. Searchable Contact Details: Improved ability to search for contact and team details on the intranet and actually find the details required, eliminating the need for handwritten lists.</p> <p>9. Electronic Diaries: The ability to be able to plan meetings, locate other team members and share this without walking around looking for desk diaries (especially if answering a telephone enquiry). Team diary for important deadlines and meetings visible to all. Site visit diary would allow car and visit sharing.</p>	<p>documents permanently and the potential associated costs with being unable to deliver information within legal time frames.</p> <p>8. Cost associated with time taken to search for details and time taken to write details in diaries on a yearly basis.</p> <p>9. Cost associated with time taken to plan meetings, walking around finding diaries, finding information on boards and associated risks with this not being up to date. Potential cost savings in car sharing.</p> <p>10. Time spent answering phone calls, resending information and searching for information. Ability to respond even if someone is away.</p> <p>11. Time spent managing documents received by email and printing them.</p> <p>12. Improved customer feed back.</p> <p>13. Reduction in processing time. Improved statistics on application processing times.</p> <p>14. Improved security of documentation, reduced risk of loosing files and sensitive information.</p> <p>15. Reduction in floor space used, increased desk space, and improved health and safety standards.</p> <p>16. Monitored usage of tools provided.</p>	<p>of working is taken up.</p> <p>7. Only occurs in the event of a disaster</p> <p>8. Immediately if diaries are no longer purchased.</p> <p>9. Immediately</p> <p>10. Long term</p> <p>11. Immediately but progressively after training.</p> <p>12. Long term</p> <p>13. Progressive improvement</p> <p>14. As soon as home working becomes available.</p> <p>15. Gradual improvement as scanning is done but no increase in storage should be seen.</p> <p>16. Long term. Once system is</p>	<p>12. Intangible</p> <p>13. Tangible</p> <p>14. Intangible</p> <p>15. Tangible</p> <p>16. Intangible</p> <p>17. Intangible</p> <p>18. Intangible</p>
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<p>10. Team Sites: Ability to share and find information with other teams and within the team without the need to use/answer telephones and send the same information out several times.</p> <p>11. Email: Improved ability to store emails and attachments connected to applications and less time spent managing the inbox.</p> <p>12. Improved customer service: Quicker response to customer calls and enquiries.</p> <p>13. Improved business service: Reducing time processing applications, legal orders resolving network issues.</p> <p>14. Home working: Increased ability to work from home and access files without the need to carry paper files to and from home which will improve document security.</p> <p>15. Reduction in storage space</p> <p>16. Knowledge management (wikis, blogs, forums): Ability to store knowledge learnt during projects or from those leaving that can later be reused.</p> <p>17. Improved ability to search intranet: Intranet is hard to navigate and difficult to locate information on.</p>	<p>17. Reduced time in searching the intranet</p> <p>18. None</p> <p>Dis benefit</p> <p>A. Increase cost and time spent scanning.</p> <p>B. Lost of productivity</p> <p>C. None</p> <p>D. None</p> <p>E. None.</p> <p>F. None</p>	<p>embedded into business as usual.</p> <p>17. Immediate</p> <p>18. Immediate</p>	
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<p>18. RSS feeds: Users would benefit from having changes to policies informed to them rather having to accidently notice.</p> <p>Dis-benefits</p> <p>A. Scanning: More time will be spent scanning documents that are received in paper format.</p> <p>B. If the system goes down no one can work.</p> <p>C. Trust that the system is reliable and up to date or paper will continue to be used.</p> <p>D. Lose of productivity whilst adjusting to new system.</p> <p>E. Physical evidence such as bricks will still need to be kept.</p> <p>F. Social networking tools have been viewed as distracting and time consuming.</p>			
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Current / Baseline performance levels	Improvement / deterioration expected	KPIs affected
<p><i>(days per year spent carrying out activity within planning)</i></p> <p>Benefits</p> <p>1. 85.5 days spent searching for files 1-2 days wait for files to return from archives occurs 3-4 times per year.</p> <p>2. No lifecycle management of documents. Limited security.</p>	<p>1. Reduced time spent searching for files Reduced waiting time for files to return from archives.</p> <p>2. More control over the lifecycle of documentation and higher security. Retention schedule available.</p> <p>3. Reduced filing time as this will be done continually.</p>	<p>Reporting on KPIs will be made quicker and easier.</p>

<p>3. 80 days spent doing major filing tidying up. 6 weeks spent logging incoming letters for support, objections etc.</p> <p>4. 210 days collating for enquiries</p> <p>5. No figures available</p> <p>6. No figures available</p> <p>7. 2 weeks taken to rescue paper documentation following flood in small area of office</p> <p>8. 53.5 days spent searching for contact details on intranet</p> <p>9. 4.5 days spent collating desk diary details, typing into one document and printing. 8 days spent organising meetings</p> <p>10. 129 days spent answering the phone, sending out information and asking for information for mainly internal teams.</p> <p>11. 1270 days spent managing email documents</p> <p>12. No baseline</p> <p>13. Planning application statistics provided to government.</p> <p>14. No baseline</p> <p>15. 674.45 linear meters</p> <p>16. None</p> <p>17. No one can find what they are looking for so they don't look instead they find a</p>	<p>4. Reduced time</p> <p>5. Reduction in occurrence of duplication. Reduced storage space</p> <p>6. Reduction in printing. Less time spent on administration tasks. Decrease storage space.</p> <p>7. . If electronic copies were kept decrease in time spent drying out documents and decreased risk of losing documents completely.</p> <p>8. Reduced time with improved search facilities and training.</p> <p>9. 4.5 days saved as no longer needs to be done. Reduced time spent planning meetings.</p> <p>10. Reduced time spent. Ability to be able to supply the information if someone is away.</p> <p>11. Reduced time</p> <p>12. Improved customer relations</p> <p>13. Improved business services and improved statistics.</p> <p>14. Improved security and ability to work from home</p> <p>15. Reduced storage space requirements</p> <p>16. Retention and sharing of knowledge.</p> <p>17. Ability to find the latest information would reduce other times from benefits 8</p>	
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contact and ask for it directly. 18. None Dis benefits A. No monitoring of scanning undertaken F. Functionality not available	and 10. 18. None Dis benefits A. Increased in cost and time spent scanning F. Increased time spent using the features.	
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Benefits that this benefit depends on	
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Cashable Benefit Value	Costs associated with the delivery and measurement of the benefit	Other Benefits that this contributes to	Dependencies on other programmes / projects
		Redaction tool dependant on version control in order to save multiple files and filing.	<ul style="list-style-type: none"> • One county one network is looking to install Outlook. • Integration of business as usual databases. • E-consultation of planning applications

Risks Identified	Likelihood	Impact	Action
<i>Culture</i> : Ingrained working practices based on paper.	High	High	

<i>Business processes:</i> these need to be put in place along with workflows, naming conventions, indexing and accountability.	High	High	Work with colleagues to document processes, naming conventions and workflows. Challenge current processes.
<i>Training:</i> Lack of training will hamper up take of the system. Differing abilities and confidence with using IT systems.	High	High	Provide training and guidance
<i>Help for users:</i> Following on from training support is required to answer questions and queries. Potential use of 'champions'.	Med	Med	Appoint champions. Produce online forums, FAQs and self help.
<i>Incentives to users:</i> 'My sites' and team details need to be up to date.	Low	High	
<i>Ease of use:</i> There is avoidance, at present, of using IT applications due to them not being user friendly.	High	High	Tailor customisation to meet peoples needs
<i>Legal requirements:</i> these will still require a certain amount of paper to be printed and stored.	High	High	

<i>Management buy in and support:</i> lack of support from management will affect up take of SharePoint.	Med	High	Engage managers.
<i>Compatibility and integration of business as usual applications</i>	High	High	Engage with suppliers; ensure solution can work with third party applications.
<i>Email system:</i> at present email is unable to support business requirements and SharePoint will increase email usage. Less integration of the present system with SharePoint than Outlook would provide, would lead to restricted benefits.	High	High	Use Outlook
<i>Management of the system</i>	High	High	Appoint system manager, provide structure of system managers and provide data owners.

Appendix C: Email Sent To AstraZeneca

Aims of the Meetings with Information and Knowledge Management Practitioners

Researcher: Suzi Holland PhD student, Loughborough University,
University Supervisor Prof. Ray Dawson

The aim of the meeting is to investigate best practice in Information and Knowledge Management (IKM) within industry by examining how knowledge management tools are selected for any given circumstances. To achieve this I am looking to talk to knowledge management workers in industry about their experiences of what works and what does not. This research is part of a PhD project being undertaken at Loughborough University.

Objectives:

1. Find out which IKM tools and methods are being used or have been used
2. How successful are the tools
3. On what basis is a tool deemed to be a success or failure?
4. To discover how tools are selected
5. To see if any case studies exist that could be analysed further
6. To find out if any form of performance measures have been utilised

The following questions are just a guide to the sort of areas I am interested in investigating and are not set in stone.

What tools are being used for information/knowledge management (IKM)?

Which tools have been found to be successful?

Have any failed?

What factors have been found to cause these failures?

How are IKM tools selected?

What problems have been found with IKM tools?

Once tools have gone live are they left to their own devices or are users actively encouraged to use tools? If so how?

Are tools regularly used by various people and is this usage monitored?

Are IKM initiatives bought in to solve problems or because they are seen as something the company should do?

Does the company culture influence the use that is made of IKM tools?

Timescales and Availability:

We are looking for all information gathering research to be completed by the end of the year (Dec 2010).

Suzi is available most times given a few days notice.

It is suggested that an initial meeting would probably require about 1 hour.

Appendix D: Interviews at AstraZeneca

Interview 1: Bo Andersson

Question	Answer
Name and Job Title	Bo Andersson: the Senior Information Strategist
Where are you based?	Based in Sweden in R and D part of company. Tools mentioned are based in this area of the organisation.
What tools are used at AstraZeneca?	Epistine, wiki, intranet, Yammer, knowledge networks, Our discovery.
What is Yammer?	Internal twitter-like tool
Who uses the tool and why?	<ul style="list-style-type: none"> • Some people are actively using this, others don't • Those using Yammer include those that are more innovative and those who see it as playing with a new 'toy' but may lose interest. • If it is an interesting topic a good discussion will ensue • If topic is of interest to that person then they take part • Topic example: 'What creates innovation?'
What are knowledge networks?	This is set up within the company they meet and use telephone conference used to share experience of KM. It uses poor tools – paper that are then put on a shelf and forgotten. They share experiences of KM rather than doing KM.
What types of Wikis are used?	<p>'Conference' is used widely but without any structure.</p> <p>An attempt was made to introduce a semantic media wiki giving more structure to the wiki in order to make the knowledge captured more useable in the long term. This was done through linking concepts and having identifiers leading to a better structure.</p>
Why was one wiki more successful than the other?	<p>The 'Conference' application does have more backing and promotion.</p> <p>The semantic media wiki did not take off due to no community, no promotion and no backing.</p>
Are there any tools used at AstraZeneca that are seen as failures?	Our Discovery was promising but not used now as this was before the portal. It was a 'tell and share', simple to use and aimed at small groups. This was a small initiative that was overtaken by the portal rather than failed.
Any other KM tools?	Epistine: This has been developed incrementally to address

Appendix D: Interviews at AstraZeneca

	<p>problems as they arose</p> <p>It is not used in the organisation, it never went live.</p>
Are there any tools that are seen as successful?	<p>Two components of the Intranet have been found to be the most useful. The Intranet usage was monitored and these two areas appeared to be the most used.</p> <ol style="list-style-type: none"> 1. Skills database: background information on workers. Successful in that it was used to find people but failed in that the users did not fill in their profiles. 2. Links database: worked as a type of favourites and able to share favourites amongst colleagues
Does everyone use the available tools?	<p>IT people are the most likely to pilot tools and tools are more likely to be used by IT workers</p> <p>Expected that everyone was capable of using the tools provided</p> <p>Tools are used in the right situation</p> <p>Small steps need to be taken to encourage knowledge sharing</p> <p>Tools are not part of business processes, though for a project team they could be used like this</p>

Interview2: Kaushal Desai

Questions	Answers
Name and Job Title	Kaushal Desai: Principal Research Scientist, Biomedical Informatics
Where are you based?	Based in US
What tools are used at AstraZeneca?	Communicator tool, Yammer, Wiki, Informal Networks (COPS)
How do the Informal Networks get used?	<p>This is a non IT type of tool with regular face to face meetings though some join by phone</p> <p>Started in January 2010, so is relatively new</p> <p>These are aimed at local colleagues, not global</p> <p>Interest at present seems high</p>

Appendix D: Interviews at AstraZeneca

	<p>There is no management backing</p> <p>An example of a network group is the Informatics group</p>
What is the communicator tool?	<p>This is used for quick messages</p> <p>If everyone busy it is the easiest way to get and share information between people</p>
How is Yammer used?	<p>Yammer is used more than the Communicator tool.</p> <p>It is used again for sharing but the user can follow people with same interests, working areas or carrying out the same activities</p>
How was Yammer introduced? And is it managed?	<p>This tool was driven from the top and is used globally.</p> <p>It is seen as something you should be using</p> <p>No team seems to manage this and it is left to its own devices</p>
How is the Wiki used?	<p>Editing what someone else has written or adding to it.</p> <p>Good response to this so far</p> <p>Has taken off by word of mouth. Meet someone who uses it and the information you want is on it you then go and get info you require and continue to use it.</p>
How was the Wiki introduced? And is it managed?	<p>Wiki is maintained and new versions and features have appeared but does not think the content is monitored by anyone</p> <p>Yammer, Wiki and the Communicator tool are new having been introduced in the third quarter of 2009 with the introduction of a new environment. They appeared as part of the new environment.</p>
Would you class these tools as successful?	<p>All the above tools were described as useful but would not be described as either successful or failures potentially as they are quite new.</p>
Have you noticed any cultural differences between the US and Sweden?	<ul style="list-style-type: none"> • These only became obvious on a visit to Sweden • No coffee machine or room in US • No place for this to happen so interaction with colleagues does not occur • Lunches tend to working lunches at desk: go down and collect lunch box go back to office and desk and eat.

Appendix D: Interviews at AstraZeneca

	<ul style="list-style-type: none"> No socialising
Does everyone use the tools provided?	<p>Not everyone uses the tools</p> <p>Editing and creating wiki pages for instance is not done by the scientist</p> <p>People based in the informatics group would use the tool but there is definitely a techno barrier among some groups of users when taking on new platforms</p> <p>No training is given on any new tool</p>
Are you aware of a KM strategy?	<p>No, there is no KM strategy announced and not aware of any either.</p> <p>There is no reason given for introducing new tools or ways that they could be useful for business as usual.</p> <p>Yammer and wiki were both rolled out by word of mouth.</p>

Interview 3: Christer Atterling

Questions	Answers
Name and job title	Christer Atterling: IM/KM Business Partner at AstraZeneca
Where are you based?	Based in Sweden. Works in CA which is positioned between IS development and the roll out of the solutions and the business
What tools are used at AstraZeneca?	Wiki, Yammer, Libraries on legs.
Why was a Wiki introduced into the organisation?	<p>There was a business case. Pharmaceutical area (making drugs) was an area that wanted a way of sharing knowledge and they asked for a tool to be found. A wiki was seen as the tool that could be used to share knowledge.</p> <p>This was in Lund (area of Sweden) that showed the interest.</p> <p>It was then seen as a good idea for everyone in the organisation and</p>

Appendix D: Interviews at AstraZeneca

	<p>following successful pilots was made global.</p> <p>People tend to try it out but knowledge took a while to be put there and therefore early adopters found little knowledge available.</p> <p>Pilots for the tool tended to take place in the IS section of the business</p>
Were there any processes put in place for the use of the tool?	<p>It was expected that:</p> <ul style="list-style-type: none"> • Editorial rights are available to everyone • Content would be available and readable by everyone no matter what device they accessed it from • Links to existing information can be added so no need to rewrite • It is expected that users edit the content themselves and are responsible for the content. <p>There were no processes in place just an understanding of how users would interact with the tool</p> <p>Without strong pull from the management this would not have taken off.</p>
How was the wiki selected?	<p>The IS department decides on which tool will be used and no one else appears involved in this decision process.</p> <p>For wikis they came up with conference system in order to share knowledge in a specific area.</p> <p>The application that was selected was initially seen as not user friendly, boring, in black and white, no images, not easy to use and not pretty. Potentially a better choice of application could have been made that was more user friendly taking into consideration the final users not just the IS department.</p>
How was the wiki rolled out?	<p>Champions were trained in how to use it and they then passed it on. Ripple effect.</p> <p>Champions supported by management</p>
Were there any guidelines to the use of the wiki?	<p>There were guiding principles discussed and developed before the tool went live. They were distributed.</p> <ol style="list-style-type: none"> 1. You make a change: power was given to the people and not to teams. It is not looked after centrally. The champions are supposed to be responsible 2. Transparency: it is ok to talk about it and ok to write about it. (issues of libel case prior to this) <p>Owner of a page makes sure of its use</p>

Appendix D: Interviews at AstraZeneca

<p>Do all areas of the business use it?</p>	<p>Rolled out globally but only used in pockets, in some areas but not in others</p> <p>HR reward/recognise people who use the tool but no one else mentioned this</p> <p>IT areas seem to use it more and it works for them</p> <p>The mind set of people in the organisation is that only the expert writes and therefore no one wants to know what I know. This prevents some users from actively contributing to wiki.</p> <p>Example of an area that uses wikis: disease area</p>
<p>Is AstraZeneca seen as ready for knowledge management and are they successful?</p>	<p>Culture, the way of thinking needs to be in place for KM to work</p> <p>Some people are ready for KM but this is not wide scale</p> <p>There is no measuring and no reasoning behind the tools at present. There are no follow up no questionnaires no tangible measures. AstraZeneca is seen as poor at this in general.</p> <p>Consequently it is hard to say if tools are success or not as no criteria or measuring takes place.</p> <p>AstraZeneca does not have many KM tools</p>
<p>Are there any tools that are considered failures?</p>	<p>Library on legs seen as a failure because it was not used</p> <p>Acronym was LOL and no one liked that.</p> <p>It identified people that had knowledge of a difficult or important area. They were considered experts in a certain field or with certain knowledge i.e. working in China. The idea was that others in that situation could then contact them. (Expert list with subject and contact details)</p> <p>It never took off but no one has any idea why not and no follow up of the failure was undertaken.</p>
<p>Yammer</p>	<p>Social networking tool and not considered by some as a KM tool.</p>
<p>Are there any examples of how this tool is used?</p>	<p>One use of it that has occurred was as a helpdesk.</p> <p>They outsourced the IT helpdesk. Before it was possible to go down the corridor and ask for help and you knew who to ask. This has changed to phone calls getting a ticket and three weeks later the matter is sorted. Yammer was used as a cry for help and the hopes that someone else has had the same problem and found a solution.</p>

Appendix D: Interviews at AstraZeneca

	Normally get an answer to problem within the hour but definitely that day. This becomes a more efficient way of solving a problem
How was Yammer introduced?	This tool was sneaked in bottom up. Not considered official and not recognised or rewarded for using it. No reason given for it appearing or ideas on how to use it. It gets used as people see fit.

Interview 4: Mikael Larsson

Question	Answers
Name and Job Title	Mikael Larsson. Director at Astrazeneca
Where are you based?	Sweden
What is the background of KM at AstraZeneca?	<p>1992- Improve data and knowledge sharing in particular concerning drug projects. The aim was to be able to collaborate collectively across areas of the business such as Lund in Sweden and the US using technology</p> <p>In a tight group with a smaller environment it is possible to drive things successfully.</p> <p>Technology should be used to help manage data.</p> <p>Technology tools such as wikis, blogs (Senior managers' blog on the intranet)</p> <p>The organisation needs to understand how these can be used to enable knowledge to be shared.</p> <p>There are big changes at AZ that could help the use of the tools and show more engagement.</p> <p>Communication: everything comes down to be able to communicate effectively and technology allows this to happen</p>
Is there a KM strategy at AstraZeneca?	<p>The organisation has not been prepared in the past to move forward and take on sharing knowledge. There are two reasons for this:</p> <ol style="list-style-type: none"> 1. Protect what you know. More political keeping data for yourself 2. The business did not understand the use that could be made of IT in helping to share knowledge.

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	<p>A key success factor to sharing knowledge is open collaboration</p> <p>AZ is seen as behind in the technology area due to it not being it's primary concern. AZ exists to make drugs. Technology is however beginning to be used and appreciated.</p>
What tools are used at AstraZeneca?	<p>Yammer: twitter, like Facebook</p> <p>This tool was driven by a group in R and D to share information in Sweden</p> <p>This is a new tool and needs to take time to evolve</p>
Do all areas of AstraZeneca use Yammer?	<p>Sweden has more active groups as they seem more prepared to share knowledge. Is this a cultural influence? US use it in part but are less open. Not used in UK. Again culture differences. They seem less comfortable with it.</p> <p>Examples of areas that use it:</p> <p>IS is very active using it.</p> <p>Medical innovation using it more; they have an active forum</p> <p>It is limited to people who feel comfortable with using it and those that understand or get some benefit out of it. Others just the see the risks of using it and sharing their knowledge and therefore do not use it.</p> <p>Commercial group in US use it. They manage the commercial business activities.</p> <p>Groups are created by accident, focussing on a need. A group is limited to small number of active members though they can have a huge number of followers/ members that are not actively participating.</p>
How has the tool been used?	<p>When 60000 people changed to a new environment these tools became available to users. Yammer at this point was used as a helpdesk. The helpdesk was inundated so either you only got help eventually or not at all. IBM helpdesk could not solve everything. If issue was thrown up on Yammer you were more likely to get an answer. Could Yammer be used as part of change management giving users an area to get answers following on from a change? (Especially one involving large amounts of people?).</p>
Is Yammer monitored or	<p>Confidential issues cannot be posted and must not violate principles.</p> <p>No control. IT is controlled by itself. You cannot post a document on</p>

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maintained?	it. The benefits over weigh the problems with what can be put on there.
Are there any disadvantages associated with Yammer?	The disadvantages are: No senior leaders No training is seen as necessary No one is encourage to spend time using the tool No promotion of tools is undertaken
How were the tools introduced into the business?	Yammer and wiki both silently appeared. They are not actively promoted. No strategy. No guidance or direction was given.
Are there any other tools?	IS are looking at introducing SharePoint. SharePoint was investigated by this particular area but did not take off. The reason for this is that a document management system was already in place and people were unwilling to even try something new when they already had something that worked perfectly well and they do not want to change. There was also the issue of another logging. They already have enough and do not need an extra one. The use of SharePoint was to bring project plans, document management systems, blogs etc. together in one place.
Any more tools?	There are knowledge sharing communities across the whole of AZ. These are face to face meetings. People have started to engage but the groups seem to have developed in specific activity areas only. These are seen as outside of everyday work and not part of business as usual and are, therefore, not recognised or appreciated by the business. Members of these groups tend to be a few hard core people again those who see a use for the meetings.
Are there any future developments?	Open collaboration with external environment is an area that is beginning to be investigated. Glaxo Smith Kline is using this already in particular drug discovery for 3 rd world countries. This is encouraging collaboration.

Interview 5: Julie Pike

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Questions	Answers
Background	Based at Alderney Park, Cheshire in the UK Has developed a knowledge sharing tool for her specific area/group.
What area is the tool aimed at?	This group contains different therapy areas such as oncology that deliver drugs. They run trials on drugs on patients testing new drugs. Although they have many different types of therapy areas within each area, the jobs are the same. Knowledge is shared within each area but also across the different therapy areas.
What was the knowledge problem?	The starting point: what they used to have Storage for lessons learnt and documents but it was not searchable. Lessons Learnt were not reused as could not find them. The same issues and the same loops were being done again and again.
What were the issues with the current system?	Customer survey was conducted to find the main issues with the current system. The issues highlighted were: <ul style="list-style-type: none"> • Time consuming to use and enter data • Not searchable and could never find anything • Not sure where to put information • Information was not reviewed • How many years later was something still best practice?
What conclusions were drawn from the customer survey?	The main criteria for the tool were: <ul style="list-style-type: none"> • Must be searchable • Must be easy for user to use • Must be reviewed • Must be quick to enter data • Must be able to find contact details <p>Although the tool was important the people using it are the primary concern and the tool seen as an enabler. The idea that the people side was the important part, not the technology behind it, was stressed</p>
How was the tool selected?	The tool was selected by searching within the company to see what was available and already in use. This was a global search (US, UK, Sweden). The tool was found in Sweden but has been changed considerably to get it to work in UK efficiently
What is the tool?	The tool itself is spreadsheet like with searchable categories. It is not high tech. Processes have been put in place to make the tool work and it is very process driven. The process for entering information into the tool is a

Appendix D: Interviews at AstraZeneca

	<p>diagram found on the intranet</p>
<p>Is the tool managed or maintained?</p>	<p>There are knowledge owners/experts who are responsible for their set categories. A category example is 'protocols'. The categories are reviewed every six months by the expert owner. It is possible to see the latest entries to a category and who entered them. The trail of who submitted them allows people to contact that person.</p> <p>Only one person at present is in charge of entering the knowledge that is emailed in for inclusion into the system to actually do the updating.</p>
<p>How is the tool accessed and used?</p>	<p>The intranet is used to access the tool: knowledge share area. Due to the intranet being hard to find items, an icon has been installed on desktops and this is now used to access the tool as well. Feedback from users said they could not find the tool on the intranet, so in keeping with the philosophy of making it as easy as possible for the user the desktop icon was implemented.</p> <p>Links are found here to forms that are completed then submitted to KM mailbox. From there the tool is updated by one person with the necessary information from the submitted form. All documents are worked from links and documents are placed in set storage areas. Originally e-rooms were used to store documents but this does not work on a global level so with this in mind it has been moved to DKP. (DKP is a storage area that anyone can access whereas e-rooms are local only).The person submitting completes the form and includes links. Categories on the form include 3 keywords.</p>
<p>How is the lessons learnt knowledge captured and reused?</p>	<p>Lessons learnt from projects are recorded here. Projects have Key Performance Indicators (KPI) and they want to learn from what goes wrong to meet KPIs that are set. This will lead to project improvement.</p> <p>Time points are used in projects at which point lessons learnt are logged.</p> <p>Facilitators are used to collect the information at the time points and are provided with a template to fill in. Can take ½ day to 1 hour to find time points in a project. This depends on number of people involved and can be global.</p> <p>Facilitators find:</p> <ul style="list-style-type: none"> • 3 wins • 3walls (blockers) • 3wisdom

Appendix D: Interviews at AstraZeneca

	<p>Template is then sent to mailbox.</p> <p>Facilitator will then find who in a different project could hit the same problem and at the right time pass the information to the project so that can do something about it or use a different approach etc. ie. learn from a previous project. Facilitator proactively goes out and networks. The tool is managed by one person.</p>
How are users encouraged to use the tool?	<p>The tool is promoted. Knowledge owners go out to teams. Champions are also used. JP connects with the champions and ripple effect used. Other promotion includes open day presence, posters, knowledge sharing web pages, icon, and intranet presence.</p> <p>Tool has no name and is used in UK only within this set group. Group has 175 permanent staff plus temporary. There 4500 based at Alderney Park though</p>
Could the tool be rolled out to other areas of AstraZeneca?	<p>Homemade tool that would potentially move to SharePoint if this is rolled out.</p> <p>The tool is rated along with the financial tools and other every day tools. One team looks after them all. If the tool was used globally it would require one person in charge of it on a regional level. The tool is heavily managed.</p>
Who is using the tool?	<p>Different used groups are using different areas of the knowledge in the tool. Admin tend to use the hints and tips areas such as how to do something and contacts. Lessons learnt used by the project teams.</p> <p>Three main uses have been noticed:</p> <ol style="list-style-type: none"> 1. Look for training, help 2. Leaders highlight issues 3. Project leaders across projects.
Are there any other tools?	<p>Yammer and wiki not used.</p> <p>There is a knowledge innovation network group. This connects with other companies outside AZ and is based at Warwick university, With Pam being the link.</p>

Interview 6: Kevin Nairn

Questions	Answers
Job title and description	Project manager at AstraZeneca
What tools have	Decision making tool: Epistine. This tool did not go live as it was too

Appendix D: Interviews at AstraZeneca

you come across at AstraZeneca?	costly to implement. It was originally a small UK group of scientist involved but interest in the project grew and the cost escalated as well.
What barriers are there for KM?	<p>The biggest barrier to KM being the lack of understanding about KM. Knowledge management is seen as a nice to have. There is a lack of understanding how knowledge can be captured and reused and the advantages of doing this. This would require a major learning curve for users.</p> <p>Change is slow at AstraZeneca users try and avoid it. The primary focus is developing drugs</p>
What other tools are there?	<p>PKT is a document management system- a library of products.</p> <p>GEL: regulatory board for clinical reports</p> <p>Both tools have a lack of structure and it is not clear where the knowledge is. They are not searchable either</p> <p>E-rooms: 'there are more of them than people' another document storage system. They are getting bigger and bigger. They are meant to be a transient repository but not used as such.</p>
Any other tools?	<p>Wiki and Yammer have been recent additions but do not use them. Played with them initially but not used them for anything in particular.</p> <p>The intranet cost a lot but is terrible at searching taking up to 20mins to find required information. This leaves users frustrated with the system and IT in general.</p>
Do tools Fail?	No tools tend to be superseded rather than fail. More money is simply thrown at the project involved. This takes time and effort and the tool morphs into something else
Does AstraZeneca offer training or promote tools?	No there is very little promotion or training. Vista went live as the new platform and new tools appeared with it such as Yammer.

Interview 7: Margaret McNaull

questions	Answers
Job title and description	Director of Continuous Improvement Programmes, Pharmaceuticals, Stockport. Investigates process improvement within R and D clinical areas.

Appendix D: Interviews at AstraZeneca

	Has a team of people: project managers and lean sigma black belts.
What projects are you working on at the moment that involves knowledge management?	<p>Initiative by company to share and learn more. This is a strategy refresh. Very broadly for this particular area they are leading the 'learning from experience' project.</p> <p>Tools are IS initiatives. No say so by the end users</p>
Why is the strategy refresh seen as necessary?	<p>People do not see the need for sharing</p> <p>Learning review tends to be done because they have to do them. Narrative lessons learnt reviews have not been found to be helpful. They are not searchable across all areas. The present method does not allow for knowledge sharing.</p>
What document management systems exist in AstraZeneca?	<p>GEL: A document management system specifically for regulatory documents. These are tightly controlled due to the type of documents that are stored.</p> <p>PKT: This is a Documentum based system.</p> <ul style="list-style-type: none"> • Marketing need to be able to access drug projects • Meeting minutes from internal meetings • Not user friendly <p>E-rooms now being used to hold working information</p>
What other tools are there?	Yammer. This is in its infancy and there is only a small amount of users when compared to the number employed at AZ
Do you use Yammer?	<p>Do not really use it. Follows some topics. Appears to be more Swedish and US participation.</p> <p>Topics include Mexico looking for help with an innovation project</p>
Any other tools?	SharePoint pilot taking place: not convinced it will help

Appendix E: Letter to Experts in Industry

Department of Computer Science

Loughborough University Leicestershire LE11 3TU UK

Department: +44 (0)1509 222681 Fax: +44 (0)1509 211586



Direct Line: 07828175134

E-mail: S.J.Holland@lboro.ac.uk

To <name of contact>
<email address of contact>

27th March 2012

Re: My PhD Research Project on Knowledge Management Tool Selection

Dear <name>,

I believe Ray has already spoken to you about my PhD research project. I am now nearing the end of my project and have developed two tools which I believe will help managers decide which knowledge management tools should be implemented in their organisation. I have enclosed a section of my thesis for you to read through. As an expert in the field of knowledge management, I would appreciate any feedback you might have on the tools suggested. In particular, do you believe the tools would be of use within your organisation?

The enclosed chapters of my thesis focus on how organisations select knowledge management tools given a knowledge problem, using Nottinghamshire County Council as the main example and case study.

I appreciate you may be very busy so you will not be able to give an immediate reply, but if you are able to read the document through and respond within the next couple of months it would greatly help me in the writing up of the final stages of my thesis.

Thank you for taking the time to read through the material sent, and I look forward to your feedback.

Yours sincerely

Suzi Holland
Research Student
Department of Computer Science
Loughborough University
Loughborough LE11 3TU

Appendix F: Feedback from Expert in Industry (Dr J Thomas)

Ray Dawson

Actions

To:

M

[Suzi Holland](#)

21 June 2012 15:19

----- Original Message -----

Subject:RE: Request

Date:Thu, 21 Jun 2012 11:07:42 +0100

From:Thomas, Jo <Jo.Thomas@Rolls-Royce.com>

To:Ray Dawson <R.J.Dawson@lboro.ac.uk>

Kind Regards,

Jo

The “knowledge management problem-tool classification grid” and “House of Knowledge Management Tool Selection” are effective practical solutions for selecting the appropriate tools to meet the KM challenges faced by businesses today. The ability to have a holistic approach that addresses not only IT, but problem requirements, business processes, risks and the capabilities of the people is the unique offering of this tool. I can see many opportunities for me to apply the tool in my working environment.

Dr J Thomas

Chief of Quality and Continuous Improvement – Engineering

Rolls-Royce Deutschland

Appendix G: Feedback from Expert in Industry (Dr P. Balafas)

Peter Balafas [peterbalafas@balowen.com]

Actions

To:

M

[Suzi Holland](#)

Cc:

M

[Ray Dawson](#)

01 July 2012 15:52

Dear Suzi,

I've reviewed your thesis chapters and here is a quick summary of comments. Please take any praise at face value and any criticism as constructive:

- I recommend including a definition of "knowledge" vs. "information" for the purpose of this thesis
- As a general rule, if managers are to use these tools, some of them would need to be simplified. For example, a manager is more likely to prefer Figure 8.3 (main body of Barrier House) or Table 1 (KM Tool Grid) or Table 7.1 (Problem requirements) in comparison to some of the more complex diagrams/tables.
- Based on experience, a more simplified model, e.g. a Pyramid instead of a House would be easier for a manager to follow. However, if it is too late to make that change then I would recommend re-thinking where each of the categories in the House are placed, so that there is a logical flow. At the moment, it is not clear why each category is where it is (for example, why are Problem Requirements defined in the left wing, outside the House?). The only model that did seem to have categories placed in a logical flow was the House of Barriers (figure 8.1), starting from the bottom and moving up (like a Pyramid).
- HoKMTS is a mouthful and difficult to remember. I'd recommend a shorter name.
- In each Chapter, when explaining how each model has been filled out, I'd recommend either placing the diagram at the beginning of the chapter or at least referring the reader to it. Otherwise you risk the reader trying to read through all the explanations before actually seeing the diagram and losing track (happened to me).
- In general, I would say that managers would find the Outputs of the Tools very useful, because it is possible in a quick glance to see Where the major problem areas are, What the most appropriate tools to use are and What the likely barriers are, etc. However, I think managers would find it difficult/time consuming to actually Apply the tools themselves, i.e. they would need someone like you that is a specialist. This is an inherent barrier. So it either needs to be recognised openly as a disadvantage of the model (there is no perfect model) or the method needs to be simplified. This is a classic tradeoff: Simplicity of Use vs. Accuracy of Results
- The benefits house analysis and alternative tools house analysis are interesting, especially when it is possible to see the mismatch between benefits and solutions to problems that are not the same at the original problems. This is usually a very strong indicator that the organisation is not focusing or analysing the "what problem are we trying to solve" and "what existing capabilities/tools can we use to solve them" questions, and your tools are good at pointing that out and refocusing.
- Overall very good tools, the Outputs are clearly useful, if you can simplify the Application of the tools then I can see these being used by managers when selecting KM tools.

Good Luck and keep up the good work

Peter

--

Peter Balafas, Ph.D.

Director

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The Need for a Systematic Approach to Knowledge Management Tool Selection

Suzi Holland and Ray Dawson
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Abstract

The case study carried out at a county council in the UK investigates the approach taken by the council to select a knowledge management tool. An analysis of the methodology used by the council to select an appropriate knowledge management tool was undertaken to discover if there was a need for a systematic approach to knowledge management tool selection. The council carried out limited research into available tools and their decision was based on using trusted software providers and strong marketing techniques by the vendors. Once the decision had been made to use Microsoft SharePoint further limited analysis was undertaken to justify using the software. The case study shows that the council did not have a systematic way of evaluating knowledge management tools which could lead to a highly underused system with high associated costs.

Keywords: knowledge management tools, tool selection, SharePoint, EDRMS, case study, document management.

Introduction

The approach taken by a county council in the UK to introduce a knowledge management tool was investigated and led to this case study. An analysis of the methodology used by the council to select a knowledge management tool was carried out to determine whether the approach taken by the council was well structured and led to a successful result, or whether there is a need for a methodology to be developed. The areas that need to be taken into consideration to enable a quality software solution to be found for a given knowledge problem were highlighted by the case study. The council were producing a business case to secure the funds required to implement an information and knowledge management solution when this case study was undertaken.

The project to introduce the new tool was based in the Communities Department of the council. This department comprises of five main departments, such as Highways and Cultural Services, which are further split into four or five smaller areas. These are then split again. The departments vary widely in their roles and include areas such as Planning Services, County Parks, Libraries and Adult learning. The council is influenced by government proposals and cuts, and is affected by elections and money issues, especially in the present economic climate.

The Information and Knowledge Problem at the Council

An investigation into the document management practices within the organisation was undertaken by the Information Manager. The saving and finding of computerised documentation files both within and across departments was found to be a major issue. There were also no clear file naming conventions which further exacerbated the problem of finding files again. Each department had a different approach to the naming of files and there were

even different approaches within the same department. It was also noted that there were no processes in place for naming, saving and reusing files. At present, many of these files are paper based with any electronic copies being kept in a variety of places, such as users' machines, shared drives and various content management tools such as IBM's Content Manager, Doc Harbor and Google Docs. This has led to problems of finding documents, duplication of documents, version control and large amounts of printing. The Information Manager decided to find a tool that could be used across all the county council's departments to manage this problem as, on further research, it was found to affect the whole organisation. The council is, therefore, looking at the introducing an electronic document retrieval management system (EDRMS) which will be primarily used to solve their filing problems. Johnson and Bowen (2005) show that an EDRMS has the potential to solve some of the issues found at the council. No other information or knowledge problems were considered at the initial stages of the project.

The council had previous attempts at introducing content management applications, such as IBM Content Manager and Doc Harbor, which are still available to use but are not perceived as providing the functionality required and are not used regularly across the organisation.

The Involvement of Loughborough University

The University's aim for the project was to investigate the process used by the council to select a knowledge management tool and to ascertain if there is a need for research to find a methodological approach for selecting such tools.

The objectives were to:

1. Document the selection process used by the council
2. Analyse the steps taken by the council
3. Understand the background of the council workers, the effect they could have on a solution and the effect they could have on the ability to make a decision
4. Determine whether the eventual decision made was both appropriate and the best solution in the circumstances
5. Determine what areas need to be considered when selecting a knowledge management tool

The council asked Loughborough University to help with a specific part of the project. This involvement allowed the method used by the council in the decision making stages of the project to be understood and gave a better understanding of other factors that could potentially influence a successful outcome, thus meeting the objectives set out above. Working in a council department gave a good insight into the daily work routines that existed and led to being able to observe the culture and issues of the organisation first hand rather than relying solely on feedback from interviews.

The Process for Selecting Knowledge Management Tools

The council decided to introduce a new solution into the organisation to solve their information and knowledge problem. The decision was based on the fact that systems already available were not performing as required, although there appears to have been no research into understanding why.

The council have a policy of putting their requirements out to tender to find suitable software solutions. They have a tendency to use vendors they have used before or those that are seen as trusted, so the systems used tend to stay with the same providers, such as Northgate and

Civica. This leads to limited research into finding new software and limits the software that can be used.

The system selected to be the EDRMS for this county council is SharePoint 2010. It was felt, by the council that, although the introduction of SharePoint would be a big undertaking, it would solve their problem of managing documents. It was felt SharePoint also offered other functionality that could benefit the organisation, but research into this was only carried out once SharePoint had already been selected.

Investigation of the benefits that SharePoint could offer the organisation took the form of a 'benefit profiling' exercise to show the need for the investment and where potential savings could be made by the organisation as a result. This was undertaken in order to secure the funding for the project and was to be included in the business case that was being put together. This benefit profiling is the part of the project that Loughborough University became involved in.

Benefit Profiling Exercise

The benefit profile exercise was used to determine what benefits could be gained from using SharePoint, what issues may need addressing and how SharePoint would affect the performance levels of the business. This included an investigation into the functionality that SharePoint offered to see what other knowledge and information problems SharePoint could solve. The profiles were then used in the business case that was put together by the Information Officer in order to secure funding for the project, by showing where savings could be made in the long term by implementing SharePoint. The University helped in the gathering the information required for the benefit profiles using the council's own methodology. This allowed the process they used to decide which tools should or could be used to solve their knowledge problem to be observed and gave an understand of why SharePoint had been selected.

For the initial stages of developing SharePoint, eight pilot areas were selected. Each pilot area was a department with around fifty to a hundred people and was selected on the basis that they volunteered to be part of the project. It was expected that they will eventually be testing the system in the work environment and be involved in the development of the tool to meet their needs. As part of the business case that is being prepared for the project, the eight pilot areas were asked to present the benefits that they felt SharePoint would offer their department. The objectives of the benefit profiling were to:

- Determine the benefits that will be achieved by introducing the system
- Determine if there are any "disbenefit" (the council terminology used for material disadvantages)
- Estimate the time spent on activities at present that could potentially be reduced by introducing SharePoint
- Highlight any issues or risks

The eight pilot areas tackled the benefit profiling on their own with the results being pooled together before being included in the business case. This was done to gain different opinions from each area without influence from each other's findings. This also allowed the Information Manager to be able to understand the common issues that were prevalent within the teams. There was a two hour presentation from Microsoft on the features of SharePoint but, other than that, each area had little knowledge of what SharePoint had to offer. The University researcher was attached to one of the pilot areas, Planning Services, to help investigate the possible benefits of implementation in that department.

The approach

The benefit profiling for Planning Services was undertaken by one member of the Planning Services team and the first author of this paper. It soon became apparent that there was no set way of approaching this task and neither was there a process for completing a benefit profile. A form was provided to be filled in and returned to the Information Manager. The form comprised of six tables as shown by table 1.

Table number	Areas covered
First Table	Responsible officer and service area
Second Table	Description of benefit or disbenefit, measure to be applied, timescale for realisation, type of benefit
Third Table	Current/baseline performance level, improvement/deterioration expected, Key Performance Indicators (KPIs) affected
Fourth Table	Benefit that this benefit depends on
Fifth Table	Cashable benefit value, costs associated with delivery and measurement of the benefit, other benefits that this contributes to, dependencies on other programmes/projects
Sixth Table	Risks identified, likelihood, impact, action

Table 1: Contents of the benefit profiling form

A brief description for each heading was given but there was no advice as to how any of the information could be gathered.

With this form as the starting point, the project team endeavoured to fill in the categories that were asked for. The time given to collect the information was very short, at just two weeks, which limited the choice and accuracy of the approach taken. It was decided that interviewing members of Planning Services would be the best approach to gather potential benefits as it was felt questionnaires would be too time consuming to be produced, distributed, filled in, returned and analysed in the time available.

To discover the benefits of SharePoint for the Planning Services, interviews were carried out with members of the three teams that make up the department. The manager of Planning Services was also interviewed. The interviews with the teams were carried out in small groups with up to four members of a team at a time. Some of the advantages of interviewing in small groups, according to Blackburn and Stokes (2000), Edward and Talbot (1999), Steward and Shaqmdasani (1990) and Robinson (1999), are:

- Faster method of gaining information
- Opportunity for those interviewed to interact encouraging snowballing of ideas
- The ability to generate more critical comments

However, some disadvantages were also noted prior to carrying out the interviews. These were:

- Responses may be influenced strongly by one member of the group (Edward and Talbot, 1999)
- Group consensus caused by pressure to conform
- Conflicts of personality (Robinson, 1999)

During the interviews, employees were asked what problems they had with day to day activities and where they felt that they wasted time with tasks taking longer than necessary. Those questioned were informed that an electronic document system was potentially being introduced and were aware that it would be SharePoint but they were unaware of the full functionality that SharePoint could offer and had not used it before. This meant prompts, such as ‘would you use wikis?’ and ‘would a team site area and team calendars be useful?’, had to be used later on in the interviews once they had revealed the problems they encountered. A basic description of wikis and their functionality also had to be given as potential users were unaware of the possible uses and benefits of using wikis or team sites in a business scenario.

Performance baseline

The time spent by employees on existing tasks was required in order to estimate any time that could be saved by introducing SharePoint. Tasks that were expected to take longer when using SharePoint were also noted. Due to the limited amount of time to collect the information, a time and motion study could not be carried out. The timings that were gathered were, therefore, based on interviewees’ estimates. The timings were used to show if the new system would reduce costs and improve productivity. It was noted that the timings would be very approximate but, as there had been no other studies or performance measures ever carried out, it gave a baseline to work from.

SharePoint

SharePoint is marketed by Microsoft as making it easier to work together by sharing sites and documents and managing the lifecycle of documents, allowing organisations to respond quickly to the changing business environment (Microsoft, 2011).

Representatives from Microsoft gave a two hour presentation to those involved in the project at the council, which included IT personnel and people from the pilot areas. The presentation was given after SharePoint had been selected as the tool that was going to be used and the talk was tailored to the needs and areas that were seen as being the main interest to the council. The PowerPoint presentation was accompanied by a demonstration but this created confusion amongst the audience as the many changes of web pages caused them to lose their bearings due to having little, if any, knowledge or contact with either SharePoint or the latest versions (2007/ 2010) of Office products which use a similar layout and content.

The reaction from those present showed that the sophistication and complexity of SharePoint was, potentially, going to be too much. The feedback from the audience showed that not all areas that were demonstrated were understood and some, it was felt, not even required. Those not required included wikis and blogs for which no one could see any use in their department. Other issues that arose from the demonstration were the need for incentives from the organisation to get users to complete people pages and team websites. Microsoft used giving a computer to the best designed people page as the incentive to encourage users at Microsoft to complete the people pages. The comments from the council ranged from ‘At the council you will be lucky to get a free cup of coffee’ to ‘I wouldn’t want to fill in the people pages as then no one will bother me’. This demonstrated the issues both with incentives and motivating the staff as well as illustrating the lack of a knowledge sharing culture in the organisation.

Further research showed that there are some known barriers to SharePoint implementation, (McLeod et al, 2010) but that the council did not appear to have taken these into consideration. These include:

- SharePoint can be difficult to configure

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- SharePoint provides too much functionality out of the box making it hard to develop
- Not as simple to use as expected

The Results

Table 2 shows a summary of the results of the benefit profiling exercise for the Planning department with fifty members of staff. The benefits that were found are listed and a description of them given. The third column shows the timings that were taken as a performance baseline in terms of the estimated number of days per year. For some benefits it was not possible to give timings. Following on from the benefits, Table 3 shows the disbenefits that were found, again with descriptions and timings, though some do not have timings as it was not possible to gage these.

Benefit	Description of benefit	Baseline performance level (Estimated days per year)
Searchable document storage	Will enforce a naming convention, documented business processes and an indexing system (not available at present). Will reduce the time spent searching archives or waiting for documents to be returned from archives and reduce the likelihood of losing documents completely.	85.5 days spent searching for files. 1-2 days wait for files to return from archives occurs 3-4 times per year.
Record management	Will give the ability to manage the lifecycle of stored documents and offer more control over their security.	No lifecycle management of documents exists. Limited security at present.
Reduced filing time	One area to file in and no printing out of paper copies. Less likely to lose files completely if processes and naming conventions are introduced (will need a filing structure and process in place to be successful).	80 days spent tidying up filing, normally between Christmas and New Year. 6 weeks spent logging incoming letters for support, objections etc.
Quicker collation of information	Easier and quicker to find documents if all in one place. (There are strict guidelines in place for the length of time taken to respond to enquiries and to provide information. Failure to comply results in fines.)	210 days collating for enquiries
Reduced duplication of documents	If documents are all in one place, everyone can access them, subject to the appropriate permissions, instead of retaining their own copy on their own machines. This would help with version control of documents.	No figures available as this is not monitored
Reduced printing	Reduction in time spent printing, cost of printing and the amount that is printed. (At present emails are printed out in full as there is nowhere to easily store them. The present email system does not allow archiving or moving of email to an external document store)	No figures available as this is not monitored
Improved disaster management	Decreased risk of losing paper files due flood damage (or fire). Some files are sole copies dating back to 1950s and others would be hard to replace. A flooding incident has already occurred in a small area of the office.	2 weeks taken to rescue paper documentation following flood in small area of office
Searchable Contact Details	Improved ability to search and for contact and team details on the intranet, eliminating the need for handwritten lists. At present, lists of contacts are handwritten in diaries and rewritten each year. (Users find them hard to find on the intranet as, although the intranet search facility does work, users seem unable to use it effectively, perhaps due to lack of training)	53.5 days spent searching for contact details on intranet
Electronic Diaries	The ability to plan meetings, locate other team members and share this information without walking around looking for desk diaries (especially if answering a telephone enquiry requiring someone's location). An electronic team diary for important deadlines and meetings would make the knowledge easy to find. Site visit diary would allow car and visit sharing. (Electronic diary tools are available they are simply not used as users find them hard to use and have had no training.)	4.5 days spent collating desk diary details, typing into one document and printing. 8 days spent organising meetings

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Team Sites	Ability to share and find information with other teams and within a team without the need to use/answer telephones and send the same information out several times due to no one being able to find it. Currently unable to find a document if someone who owns the document is away.	129 days spent answering the phone, sending out information and asking for information for mainly internal teams
Email	Improved ability to store emails and attachments connected to building permission applications and less time spent managing inboxes.	1270 days spent managing email documents
Improved customer service	Quicker response to customer calls and enquiries.	No figures available
Processing customer enquiries.	Reducing time processing applications, legal orders resolving network issues.	Planning application statistics provided to government.
Home working	Increased ability to work from home and access files without the need to carry paper files to and from home, which will improve document security	Activity not carried out at present
Reduction in physical storage space	At present large areas of floor space are taken up by filing systems. There are files in boxes and loose files located by desks on the floor posing potential health and safety hazards.	674.45 linear meters is the space presently taken up by filing systems in the office
Knowledge management (wikis, blogs and forums)	Ability to store knowledge learnt during projects or from those leaving, that can later be reused. (There is a reluctance to accept these types of tools have a use in the work place.)	Activity not carried out at present
Improved ability to search intranet	The intranet is hard to navigate and locate information. No one can find what they are looking for so they find a contact and ask for it directly.	No figures available
RSS feeds	Users would benefit from having changes to policies informed to them rather having to accidentally notice a policy has been altered.	Activity not carried out at present

Table 2: Benefit profiling results

Disbenefit	Description of Disbenefit	Baseline Performance Level (<i>Estimated days per year</i>)
Scanning	More time will be spent scanning documents that are received in paper format	No monitoring of scanning is undertaken at present
Reliability of system	If the system goes down no one will be able to work.	No baseline
Trust the system	Users need to trust that the system is reliable and up to date and that the latest versions of documents are available or paper will continue to be used	No baseline
Initial loss of productivity	Productivity will decrease while users adapt to the new system.	No baseline
Physical evidence	The Department retains physical evidence, such as house bricks, in order to be able to refer to the colour and shape of them when deciding on approving Planning applications. These will still need to be stored.	No baseline
Social networking tools	These are still viewed as having no place in the workplace as well as being distracting and time consuming	No baseline

Table3: Findings for disbenefits

Table 4 shows the issues and risks that were identified during the interviews. The risks were seen as problems that could prevent a successful implementation of SharePoint. The third column showed how likely an issue was to occur and the fourth column the impact the risk could have on the success of the project.

Risk identified	Description of risk	Likelihood (High, Medium, Low)	Impact (High, Medium, Low)
Culture	Ingrained working practices based on using paper are evident and changing these will prove to be hard. It will not be possible to force workers to stop using the paper method that they are accustomed to and comfortable with.	High	High
Business Processes	There is little evidence of any processes in place and they are not documented. These need to be put in place along with workflows, naming conventions, indexing and accountability for SharePoint to work effectively.	High	High
Training	Previous tool implementations have shown that a lack of training is given when a tool goes live, leading to limited up take of tools. SharePoint is going to require good training to be in place to ensure this does not occur again.	High	High
IT abilities	Users of the system have varying IT abilities with some users being unwilling to take on new skills.	Medium	Low
Help for users	Support is required to answer questions and queries that arise from day to day use. Potential use of 'champions' may help this.	Medium	Medium
Incentives for users	'My sites' and team details need to be kept up to date by users. During the marketing pitch, Microsoft suggested that incentives were required to encourage users to update their profiles.	Low	High
Ease of use	There is avoidance, at present, of using IT applications due to them not being user friendly. This could be combined with training issues as well.	High	High
Legal requirements	These will still require a certain amount of paper to be printed and stored	High	High
Management buy in and support	A lack of support from management will affect up take of SharePoint. If managers do not use the system others are unlikely to bother.	Medium	High
Compatibility of 'business as usual systems'	'Business as usual systems' need to be integrated into SharePoint. Users do not want more systems to log into nor do they want to be finding it hard to transfer data from one system to the next.	High	High
Email system	The email system is unable to support the business requirements that are currently required and SharePoint will increase the email usage. Sharepoint would provide less integration with the present system (Lotus Notes) than Outlook would, which would lead to restricted benefits.	High	High
Management of system	Security of the system and regular backups of files required.	High	High

Table4: Results of Risk Analysis

Analysis of the Benefit Profiling Results

From Tables 2 and 3 it can be seen that there are many more benefits than 'disbenefits' for going ahead with the implementation of SharePoint, although Table 4 does show that there are several issues that need to be resolved for SharePoint to be successful. These issues and the high impact that they could have should have been investigated more thoroughly at the beginning of the project when they could have influenced the choice of tool. These issues are:

- Culture: paper vs. electronic

The Planning Services pilot group seem to use little in the way of IT solutions, sticking to traditional paper methods ranging from using desk diaries to pieces of paper on the wall to indicate the weekly whereabouts of the team (team members are required to leave the office to make site inspections) as well as having a very paper-based document management system. The diary scenario leads to difficulties in planning meetings as there is no way of easily finding out the availability of members for meetings without physically going around the office and looking at everyone's diary. At present there are electronic versions of calendars but no one uses them as they are seen as difficult to use, however, they have had no training and there are no incentives to use them as desk diaries are provided by the council.

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The planning services group feel that it is a large step to use electronic solutions to replace their paper base system, which they consider to be the norm, especially as the present paper base system works for them, though they agree that it is not perfect. They are very sceptical of relying totally on an IT system having had previous bad experiences with the previous council IT tools, such as systems not working or not being able to use them efficiently due to lack of knowledge.

The move from a highly paper based system to an electronic one will result in a change of culture. The employees are very set in their ways and sceptical of change, especially a change they see as being of little benefit to them. Changes in culture in any organisation are reported to be hard to deal with (Davenport et al, 1998; Du Plessis, 2008; Storey and Barnett, 2000). Preventing employees from continuing to use paper and not printing documents is challenging as it is difficult to remove the temptation of using the present, familiar system.

- The processes

The paper based document management system used at present is one problem that those interviewed in the pilot area all agreed needed sorting out. They are still reluctant to relinquish the paper but could see ways that electronic copies would potentially make a difference. The main concerns were the lack of processes in place and the lack of naming conventions across departments. Each department has a different method of naming files, leading to duplication of files and being unable to find them again. SharePoint will need clear processes in place and an agreed naming convention for the system to work. This leads to the conclusion that addressing these issues would help alleviate the present system irrespective of whether SharePoint was implemented or not. SharePoint will not provide processes and will not provide a naming system. There are few known processes in place in the business, and even fewer are documented. Research by Wilkins, Swatman and Holt (2009) found that implementations of EDRMS systems were more successful if mapped to business processes.

- Training

A problem that was noted with present systems was the lack of training given when new systems and tools went live. The users felt this is the main reason why the current IT tools are avoided. An example of this is the electronic calendars that are available but are not used within Planning Services. The users will require training in order to utilise SharePoint (Herrera, 2008) or they will continue with their present practices. At present, users are left to their own devices in deciding how, where and when tools should be used which has led to them not being used at all.

The various departments work in silos and the different departments have different approaches and abilities regarding the current IT tools. Enquiries of the other pilot areas showed that some departments are more willing to use IT tools than others but the same training issue is still present. The Planning Services team, in particular, lacks IT knowledge and, without training, will be unlikely to make full use of the new system. Research by Henriksen and Andersen (2008) and Maguire (2005) into adoption of EDRMS systems showed that training the users was a key area for successful uptake of the system.

- IT ability and reliability

There would also be doubts about the IT department's ability to implement and maintain such a system. If the system goes down, people will not be able to work as they would become reliant on accessing the documents and information online. A disaster management program would need to be employed with a reliable backup procedure for files. There are also the issues of migrating the present documents and the integration of currently used databases. In

just one department alone there were several key databases that would require integrating with SharePoint.

Some of the problems and issues that surfaced were not necessarily directly connected to introducing SharePoint but would need addressing to make full use of SharePoint, the main example being email. Email at the council is a huge problem and is shown in the results by the large amount of time employees spend trying to move and access emails and their attachments. A major issue within the department is the present email system. Outlook, the preferred email client for use with SharePoint, is not used at the council. SharePoint relies heavily on using an email system and, although will integrate with Lotus Notes, the currently used email system, it does not offer the same functionality. From the results of the benefit profiling, it can be seen that the present email system is already overloaded and causing time wasting issues. This could be resolved without the need to implement SharePoint simply by upgrading the email system. The main reason given for not using Outlook was the extra cost that would be incurred in running it.

- Cost

Although SharePoint will offer the document management system that is required, it also offers many more features to encourage knowledge sharing throughout the business. The cost of buying and implementing SharePoint and then not fully utilising it must be taken into consideration. The council seem to be making a large investment in a tool that would only be partially used.

- Organisational readiness

The readiness of the organisation to take on a system such as SharePoint needs to be questioned, and it must be asked if the Council is ready for knowledge management. The business processes are not in place, users are not prepared, capable or willing to accept a new system, and the IT abilities of the organisation are lacking. These are all issues that need to be managed for successful implementation (McLeod and Hare 2005). This leads to the conclusion that the people, processes and IT ability of the organisation need to be taken into consideration when deciding on a knowledge management tool. Carrillo et al (2003) found that one of the key issues in successful implementation of knowledge management tool was the readiness of an organisation, especially in relation to the potential users of the new systems.

Potential Success

Many of the above issues have been identified in research literature as being potential causes of failure of knowledge management projects. Davenport et al (1998) identified eight factors that influenced the success of knowledge management tools, while Wong (2005) and Wong and Aspinall (2005) found eleven issues, many of which have arisen during the benefit profiling exercise. These include that people need to have the relevant skills to produce the best results and the motivation to use the system (Hahn and Subramani 2000; Bishop et al, 2008; Liebowitz, 2000), both shown to be lacking at the council. The systems need to be maintained and backed up which relates to the issues of reliability raised at the council. Cost is seen as a barrier to success (Davenport et al, 1998; Du Plessis, 2008) due to the high costs involved in implementing a tool and the difficulty in linking to economic performance. The benefit profiling exercise suggested some possible cost savings associated with the implementation but present performance is not measured in any way. Culture is seen as the one of the biggest barriers to successful knowledge management initiatives (Davenport et al, 1998; Du Plessis, 2008) and is also noted as being one of the hardest things to change in an organisation (Storey & Barnett, 2000; Wilson, 2004).

Analysis of the Approach Taken by the Council

An analysis of the approach that has been taken by the council shows that there were several steps to their process. Figure 1 shows the steps that were identified.

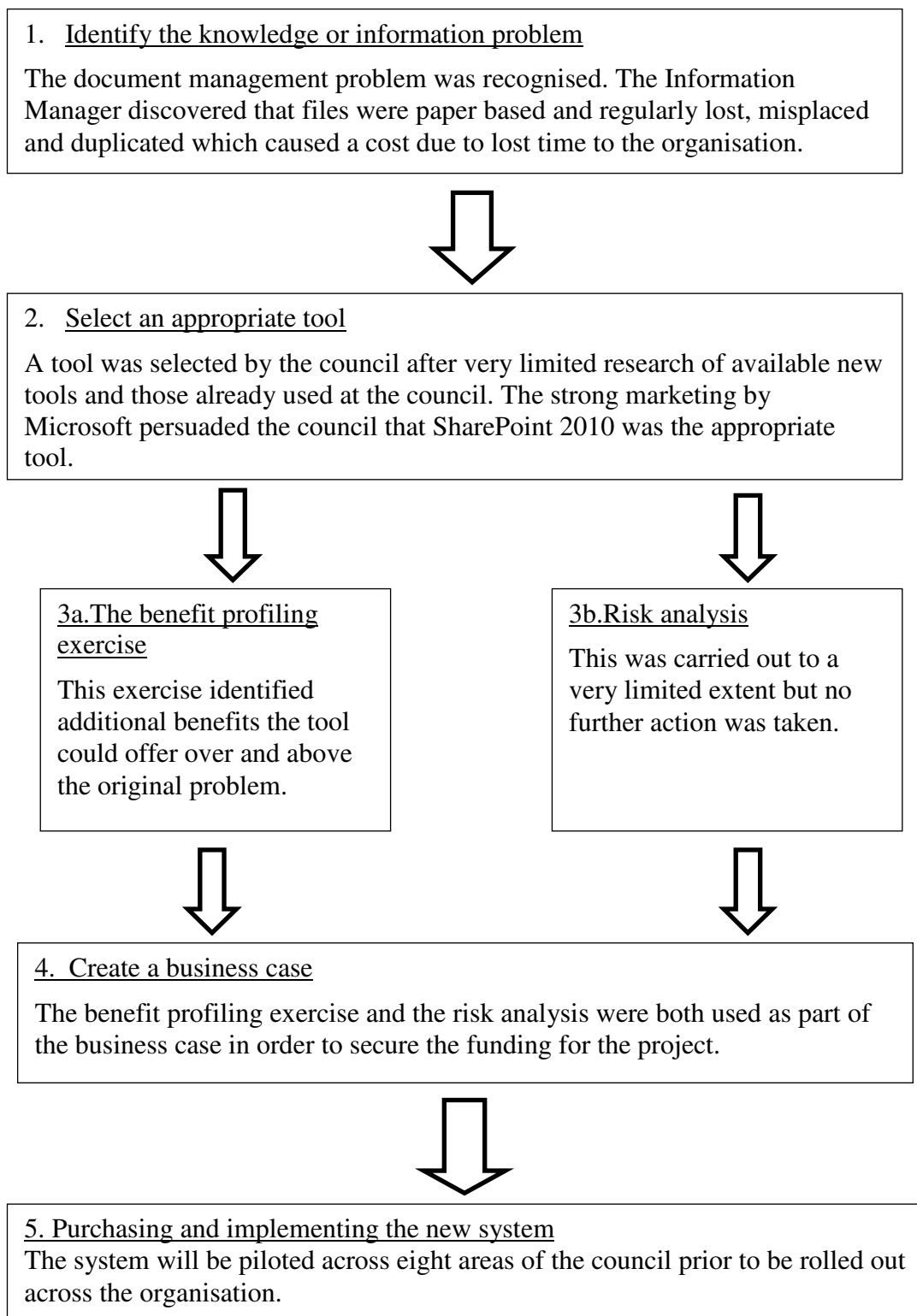


Figure 1: The Selection Process Used by the County Council

The above steps, however, were subject to inconsistencies and problems as follows:

1. Inconsistent scoping of the problem analysis

The initial analysis looked solely at the document issue as this was seen as the problem needing to be solved. The knowledge management tool selected was based on the initially identified problem alone. No further analysis of knowledge problems or other issues that could affect a solution were considered in this selection. Other areas that the tool might contribute were sought after the tool had been selected, and were part of the focus of the benefit profile exercise. The effect of these on the project and how they could be addressed was not considered. This shows that the other problems found were used only to justify the use of the tool once it had been selected, rather than being part of the process to find the most appropriate tool. This could potentially lead to the tool later being used to solve problems that are not even recognised as such by the employees or the business. Previous research by Dawson (2008) showed that this approach is unlikely to be successful.

2. Alternative tools were not considered

The choice of knowledge management tool was not based on any analysis. It was made on the basis that the council was aware of document management software that could be used (according to its marketing) to solve the problem. Other potential tools were not even considered.

3. Limited examination of alternatives for the tool selection

The limited number of tool providers that could be used, limited the tools that could be investigated. However, there was not even further investigation into the tools that were already used in the organisation to see if they could be improved to solve the problem or used to solve some of the other problems found in the benefit profiling exercise. There was no systematic approach for deciding which tools could offer a solution to a problem and no way of assessing the issues that could affect the implementation of any tools.

4. The timing of the business case

The benefit profile was used to strengthen the business case to secure the funding for the project showing how SharePoint could be used within the department to streamline day to day business. It was hoped that the benefit profiles would show where savings could be made in the long term by reducing staff numbers. As the timing and purpose of the business case was only to justify the tool selection, it was not and could not be used to obtain the best solution.

5. The invention of problems

To justify the selection of the SharePoint, the council looked for other problems the tool could solve in the benefits profiling exercise. However, many of the identified problems were not issues that the users felt were so significant they needed resolving. Dawson (2008) found that starting from a recognised knowledge problem yielded a more successful outcome. In the case of the council, the invention of these other problems that were to be solved merely distorted the business case and distracted from the task of solving the problem originally identified.

6. Poorly defined methodology

The process of benefit profiling was not well set out. A form to fill in was provided, but there was no explanation of how to use it and no defined way of approaching this exercise. The profiling exercise was open to interpretation by each pilot area which, in turn, led to different and limited results being included. The form itself was badly designed with connected

sections being on different pages. For example, the performance levels were not completed by other pilot areas as there was no guidance given in how to complete this. The benefit table and the performance level associated with the benefit were actually in different tables with no way of associating one with the other. This made understanding the results hard to follow. The outcome was that different results were produced for each pilot area, preventing comparison of one area with the next and showing no clear way that the tool could be used across the whole organisation.

7. A lack of knowledge about possible tools and the tool selected

As the council used few knowledge or information management tools, there was little expertise on such tools in the organisation which meant, in the pilot areas where the benefit profiling and risk analysis was carried out, those involved did not know what SharePoint or any possible alternatives could offer, so they could not effectively consider the benefits or risks for their department.

8. Incomplete analysis

The benchmarking of existing systems and the comparison of costings was only fully carried out in the Planning Department, largely because of the expertise and assistance of the University. This analysis was very patchy in the other pilot areas. Similarly, the risk analysis was only completed in the Planning Department and was largely ignored elsewhere. Even where the risk analysis was produced it was then not properly used for the business case. Indeed, the risk analysis appeared to be a tick in the box exercise to show something had been done as there was little attempt to make use of it.

9. No consideration of people and organisational culture

The process used by the council to select a knowledge management tool did not take into consideration the culture and the people that work in the organisation. Some existing tools were not being used as expected, but there was no understanding of why this was the case. This was taken as a reason for investing in new tools rather than being a source for investigation. Many of the employees at the council were used to working with paper documents and did not have an understanding of how electronic systems could or should be used, let alone envisage the process improvements that could result. Even without an in depth analysis, the University researcher involved could see that a lack of consistent naming conventions, a lack of ownership of online documents, a lack of trust in the tools to perform tasks as expected and a lack of training on how to use the tools contributed to the poor use of the existing tools.

10. A lack of defined business processes

The council could have looked at getting better processes in place to use the existing tools more effectively. An investigation of what the problems were with these tools would identify if the issues would also affect a new system being implemented. There are very few business processes in place in Planning Services, but SharePoint will require business processes to be in place and will not magically solve these issues.

In summary, it was clear that the council had rushed into the decision to purchase SharePoint. They had clearly been influenced by the marketing of the tool. While SharePoint is undeniably a powerful and sophisticated tool, without the processes in place and the training of the workforce, it is clear that the council were not yet in a position to take advantage of the tool's qualities.

Conclusions

SharePoint has the ability to provide the council with the EDRMS functionality that was originally required. The council, however, would only partially use the software, and even then, the benefits would only be seen if the council puts the processes and systems in place to take advantage of the tool's capabilities. Other alternative solutions may have been equally effective had these processes and systems been put in place, and indeed the existing tools used by the council may have been quite sufficient to solve the problems identified. The costs involved with purchasing SharePoint suggest that other solutions should have been further analysed before it was selected. SharePoint will meet the requirements of the business but it will be hard to implement, difficult to get staff using it and needs a change in the organisational culture. This leads to the conclusion that the council is not yet ready for such a big change and this could lead to an expensive result with only limited success.

The time spent at the council proved to be very revealing from the point of view of Loughborough University. The close involvement with the council enabled the council's processes to be identified and analysed. The process used by the council for the benefit profiling exercise had not previously been documented and it was clear that it was not an optimal process. This process was somewhat haphazard in its execution leading to only superficial coverage of the benefits and risks by many of those involved. This provides justification for a clearly set out process to select an appropriate tool to solve a knowledge problem.

A systematic way of analysing the knowledge problems is required in order to find a suitable solution. The case study at the council has shown that the areas that need to be considered when selecting an appropriate tool include all possible tools, the business processes, and the capabilities of the people as well as the IT. This case study has, in fact, provided a justification for the House of Knowledge Management Selection and Knowledge Tool Matrix that were described in the authors' previous papers (Holland & Dawson, 2009; Holland & Dawson, 2010; Holland & Dawson, 2010)

The systematic use of methods and tools, such as those previously suggested by the authors, would have enabled the council to select the most appropriate tool that would fit the problem rather than finding problems to fit the tool as the council ended up doing. The ability to understand how issues and risks could affect the choice of tools also needs to be analysed and then a tool should be chosen based on this analysis. A lack of analysis of the problems, solutions and alternatives will result in a high quality system that is underused, has high costs associated with it and does not provide a quality solution.

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