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NELLIE EL ENANY

DEVELOPING A KNOWLEDGE MANAGEMENT FRAMEWORK FOR AN INNOVATION TEAM

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DEVELOPING A KNOWLEDGE MANAGEMENT FRAMEWORK FOR AN INNOVATION TEAM

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ABSTRACT

In today's current business world it is becoming exceedingly difficult not only for organisations to compete but also to sustain competitive advantage. Organisations are realising that the key to this is not only knowing what knowledge resides in the organisation but knowing how to use this knowledge to create an innovative and differentiated product or service. Organisational knowledge provides a platform for innovation and allows individuals across the organisation to share creative ideas and inject these ideas into reinventing existing products and services as well as designing and creating new ones. Innovation is enormously dependent on knowledge and therefore its availability and quality. As part of promoting innovation, organisations are assigning teams of employees to take part in creative and technical thinking meetings to support and promote innovative practices. They key to the success of these meetings, and ultimately the innovative practices they promote, is to ensure that their planning, follow-ups and the actual meeting itself are effectively managed, measured and monitored effectively.

This thesis explores an innovation team and the ways in which their activities can be improved or changed through effective knowledge management hence ensuring the continued success and longevity of the organisation. The analysis of the findings highlighted the importance of promoting innovative activities, knowledge management tools and planning and monitoring all stages of a meeting and its outputs.

The research carried out enabled a knowledge management framework for an innovation team to be developed highlighting areas were key changes or improvements were required. It is anticipated that the framework will assist innovation teams to appreciate that all the stages of an innovation activity are vital specifically the outputs in *both* an explicit and tacit form.

Acknowledgements

Alone we can do so little; together we can do so much. **Helen Keller**

I am deeply grateful to Dr. David Baxter, my academic supervisor, for not only his continued academic support and expertise but also for his kindness and understanding. He has taught me so much in such little time about the *many* facets of academic life!

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I would like to extend my deepest thanks to all the participants, including all the companies and academics, who took their own time and effort to participate in this research. A special thank you to; Mrs. Anna Adams, Dr. Ayman Al-Fatatry, Dr. David Coates, Mr. Laurent Coquette, Professor John Bessant, Mr. Hemant Jariwala, Professor Enrico Motta, Dr. Sarah Pearson and Professor Roy Sandbach for their support.

All my loved ones have been a rock to lean on throughout this year and for that I love them even more! My mother, father and brother have been friends, teachers and critics along the road - I am eternally grateful!

All my special friends along this journey have kept me sane, at times, and provided me with crazy distractions - you have all left your marks in my heart…

Finally, I would like to thank Dr. Essam Shehab for giving me the opportunity to embark on this unforgettable and exciting journey of knowledge management for innovation…

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Acronyms

BAE Systems	British Aerospace Engineering
EADS	The European Aeronautic Defence and Space Company
IT	Information Technology
ITP	Innovation and Technology Partnership
MBDA	Matra BAE Dynamics Alenia
MBDAi	Matra BAE Dynamics Alenia Innovation
R&D	Research and development
WSS	Windows Share Point Services

CHAPTER 1: INTRODUCTION

1.1 Introduction

This work aims to research the areas of knowledge management and innovation in the context of an innovation team. It sets out to investigate the activities of the team by identifying which areas use knowledge management and subsequently analysing if these areas can be improved or changed to make the team's activities more effective. A knowledge management framework for an innovation team will be developed to support its activities and ensure that the organisation in general is more successful. This chapter provides a background of this project and the industrial sponsor, the motivation behind this project and the structure the thesis will follow.

1.2 Industrial Sponsor – MBDA Missile Systems

This project was carried out with MBDA missile systems, the industrial sponsor. MBDA is an industrial leader in the missile systems sector operating in France, Germany, Italy and Britain. It was created in 2001, following the merger of Matra BAe Dynamics in the UK and France, Aerospatiale Missiles in France, Alenia Marconi Systems in the UK and Italy and in 2005 EADS/LFK in Germany. MBDA is supported by three major shareholders; BAE Systems (37.5%), EADS (37.5%) and Finmeccanica (25%).

MBDA is the first fully integrated European Defence group managed under a single operating structure. It supplies and delivers weapon systems to the armed forces and has a strong reputation in being alert to customer needs.

Figure 4.1, taken from the February 2008 MBD Corporate Presentation, illustrates the European Consolidation of MBDA over the past ten years. This highlights not only the internal cultural integration of MBDA but also the different external markets it operates in.

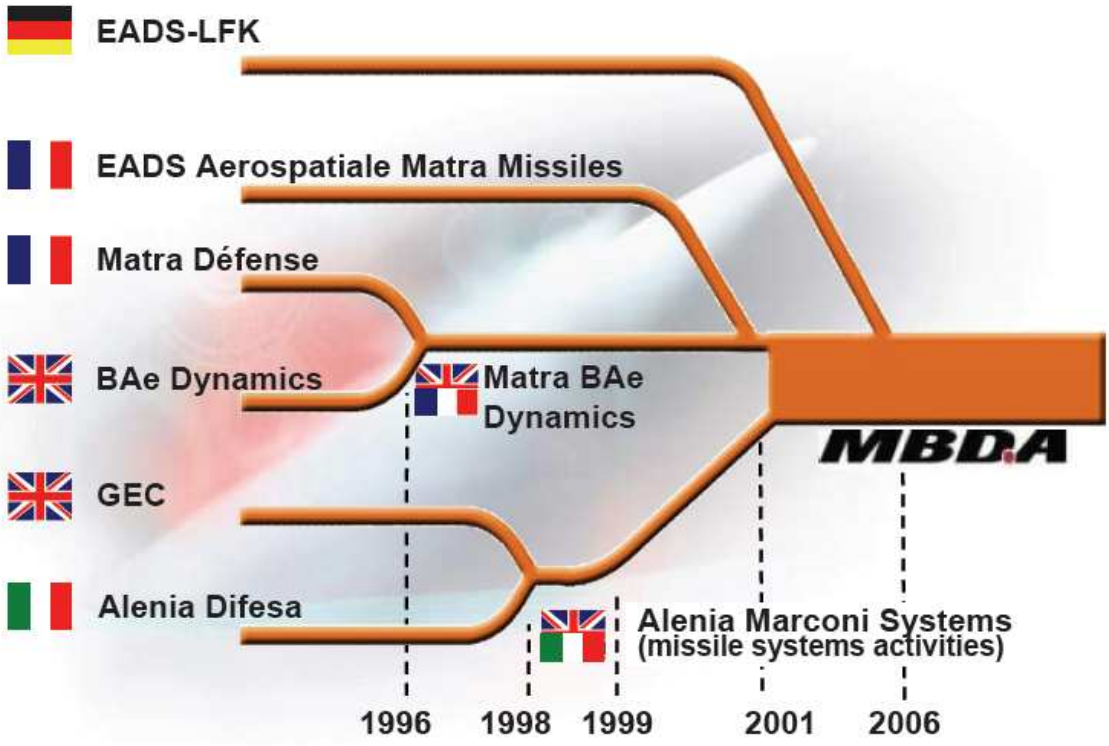

Figure 1.1: European Industry Consolidation (http://mbda.co.uk/)

Innovation is at the heart of MBDA's strategy and they continuously use this innovation to generate growth and remain at the forefront of the missile industry. MBDA Britain and France have recently launched an Innovation and Technology Partnership (ITP) focusing on materials and components for missiles. This project falls in line with MBDA's key strategic objectives of innovation, operational excellence and European integration.

1.1.2 Innovation Office

In the context of this project, the research focused specifically on the innovation team or office at MBDA. Knowledge management, intellectual property and the technical institute were not investigated but because there is a cross over with the innovation office and knowledge management, they were considered and the relevant individuals interviewed. The innovation team or office at MBDA is currently made up of an innovation manager in the U.K., France and Italy. An innovation manager is still to be allocated in Germany as they recently joined MBDA in 2005 (Figure 1.2).

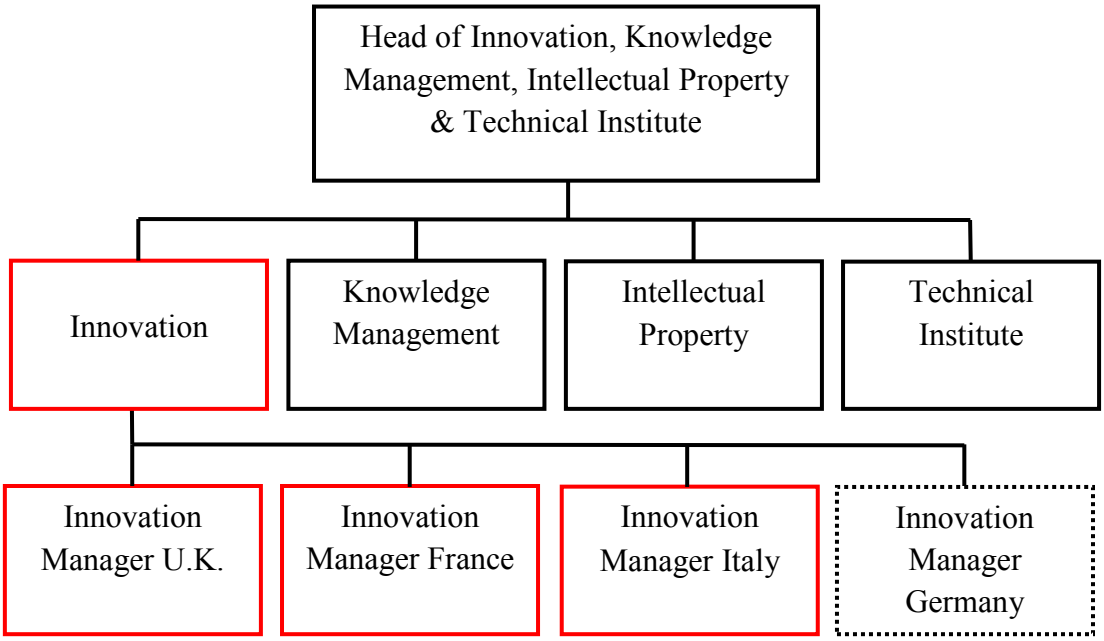

Figure 1.2: MBDA Structure (Relevant to Project)

1.3 Research Motivation

In an exploratory study by Darroch *et al.,* (2000), with '16 senior marketing managers, information technology managers and CEOs', 'limited use of knowledge management processes' was found, making it more difficult to determine which processes may be more effective in 'facilitating the transfer of knowledge'. Additionally, the link between knowledge management and innovation was, 'acknowledged and seen as circular', however Darroch, *et al.,* (2000) maintained that the link between knowledge management and innovation was still uncertain and required further research.

Additionally, in a best practice report by the American Productivity and Quality Centre (APQC, 2003), to determine the relationship between knowledge management and innovation, several key trends were found in the participating organisations. Amongst these; knowledge management systems were found more likely to improve the efficiency of innovation rather than produce *more* or *better* innovation. Knowledge management tools, IT infrastructure and knowledge repositories were essential in innovative organisations as well as having access to 'expertise locators'; people with knowledge.

Knowledge management for innovation is increasingly regarded as vital for an organisation which wants to maintain competitive advantage and provide its end customer with a value added product or service (Du Plessis, 2007). MBDA supported this research and recognised that it was essential to identify where knowledge management in their innovation office could be improved and a knowledge management framework for their innovation team to be developed. This would enable their innovation office to function more successfully, deliver useful services to their customers[1] and continue to grow through marketing themselves as an internal brand within MBDA. A case study of MBDA along with the challenges faced is explained in further detail in Chapter 4.

1.4 Aims and Objectives

The aim of this project is to:

- Develop a Knowledge Management Framework for an Innovation Team

In the context of this project, the innovation team is MBDA's innovation office, as shown in Figure 1.3.

The objectives of the project are:

- *Understand MBDA's current integrated innovation team to identify where challenges exist and improvement can be made*
- *Identify current industry use of knowledge management for innovation team through an industry study*
- *Develop a framework consisting of recommendations to the innovation office on their innovation activities*
- *Validate the proposed recommendations with MBDA to assess the ease and affect of any possible changes which could be implemented.*

[1] The innovation office's customers are the participants, problems owners and anybody who benefits from the services which they provide within MBDA. These services are discussed in further detail in Chapter 4.

1.5 Thesis Structure

This thesis, including this introductory **Chapter 1**, consists of eight chapters (Figure 1.3). **Chapter 2** is a comprehensive literature review of previous work and related relevant areas to this project are investigated. The chapter explores knowledge management, innovation and the relationship between the two. It also highlights industrial examples of knowledge management and innovation in practice to provide a real life cases. The research methodology used in this project is described in **Chapter 3** as well as why these methods were used for this project. **Chapter 4** details the case study of MBDA, their innovation team, innovation activities and knowledge management in the innovation team. The chapter also explains the challenges MBDA were facing, the academic, company and industry interviews and the initial observations from them. **Chapter 5** provides an analysis of the findings of the different interviews and industry study. The chapter concludes with how these findings were used for the development of the knowledge management framework for the innovation team. The knowledge management framework the innovation team is developed in **Chapter 6** with its validation with MBDA in **Chapter 7**. The thesis concludes with the discussions and conclusions in **Chapter 8**.

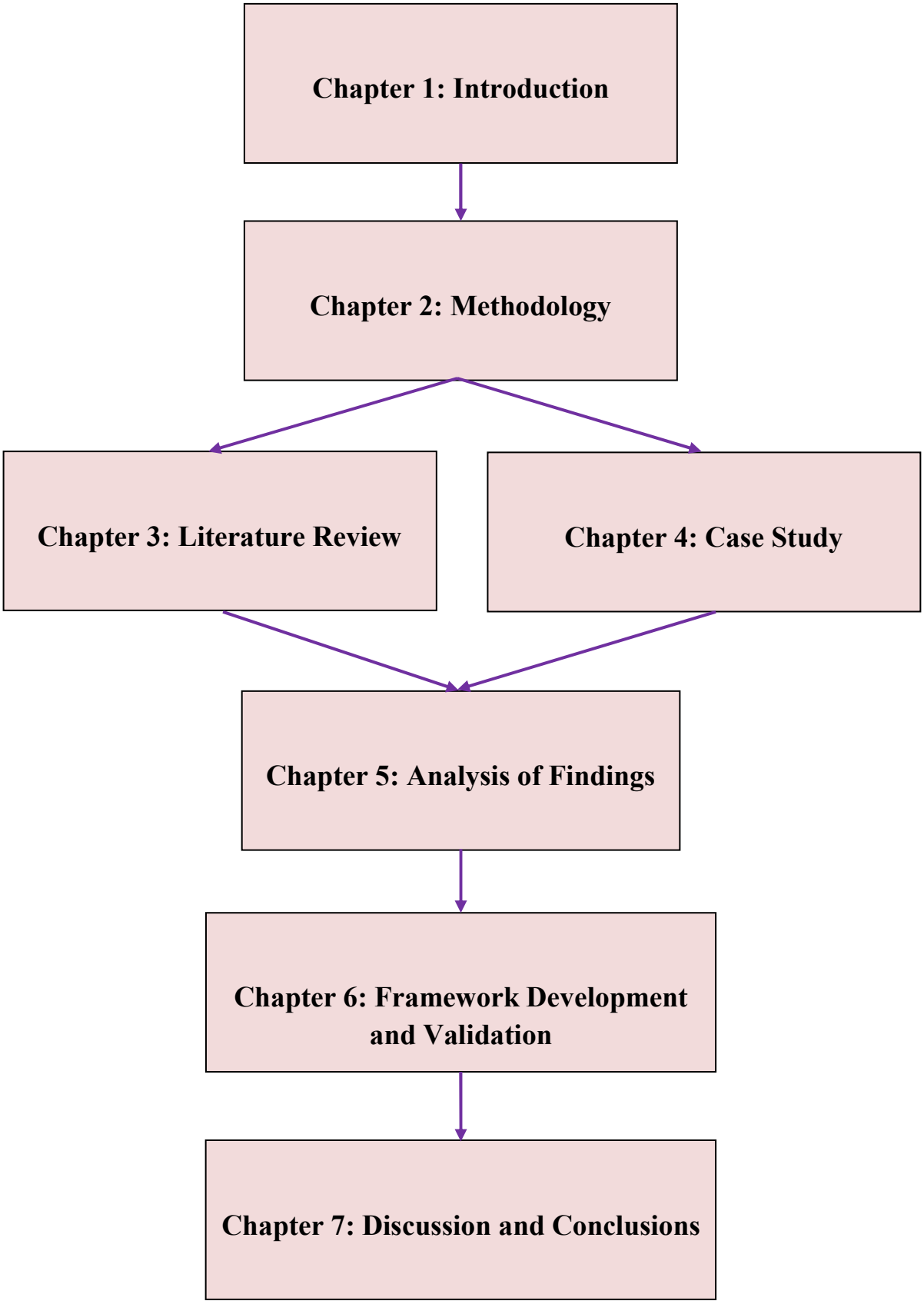

Figure 1.3: Thesis Structure

CHAPTER 2: RESEARCH METHODOLOGY

2.1 Introduction

The aim of this research is to develop a knowledge management framework to support and enhance an innovation team. Following the identification of the aim, objectives and scope of this research, the most appropriate research methodology was identified. Each research activity was carried out in order to achieve each individual project objective. This chapter will explain the research methodology which was adopted to carry out this research.

2.2 Research Methodology Process

The research followed a four phase approach (Figure 2.1), consisting of:

Phase 1- Initial Investigation: The research project was understood and defined through initial semi-structured interviews both with employees from MBDA and with individuals from a range of other industries. Workshops organised by MBDA were also attended to gain an understanding of the context of the work.

Phase 2 - Literature Review: This phase was carried out in parallel to Phase 1 and consisted of an in-depth literature review which included interviews with academics from the relevant areas.

Phase 3 - Questionnaires: Questionnaires were administered in this phase, both to employees of MBDA and also to individuals from a range of other industries, some of whom took part on Phase 1.

Phase 4 - Analysis and Method Development: The results from the previous phases were analysed, recommendations determined and validated, and findings documented.

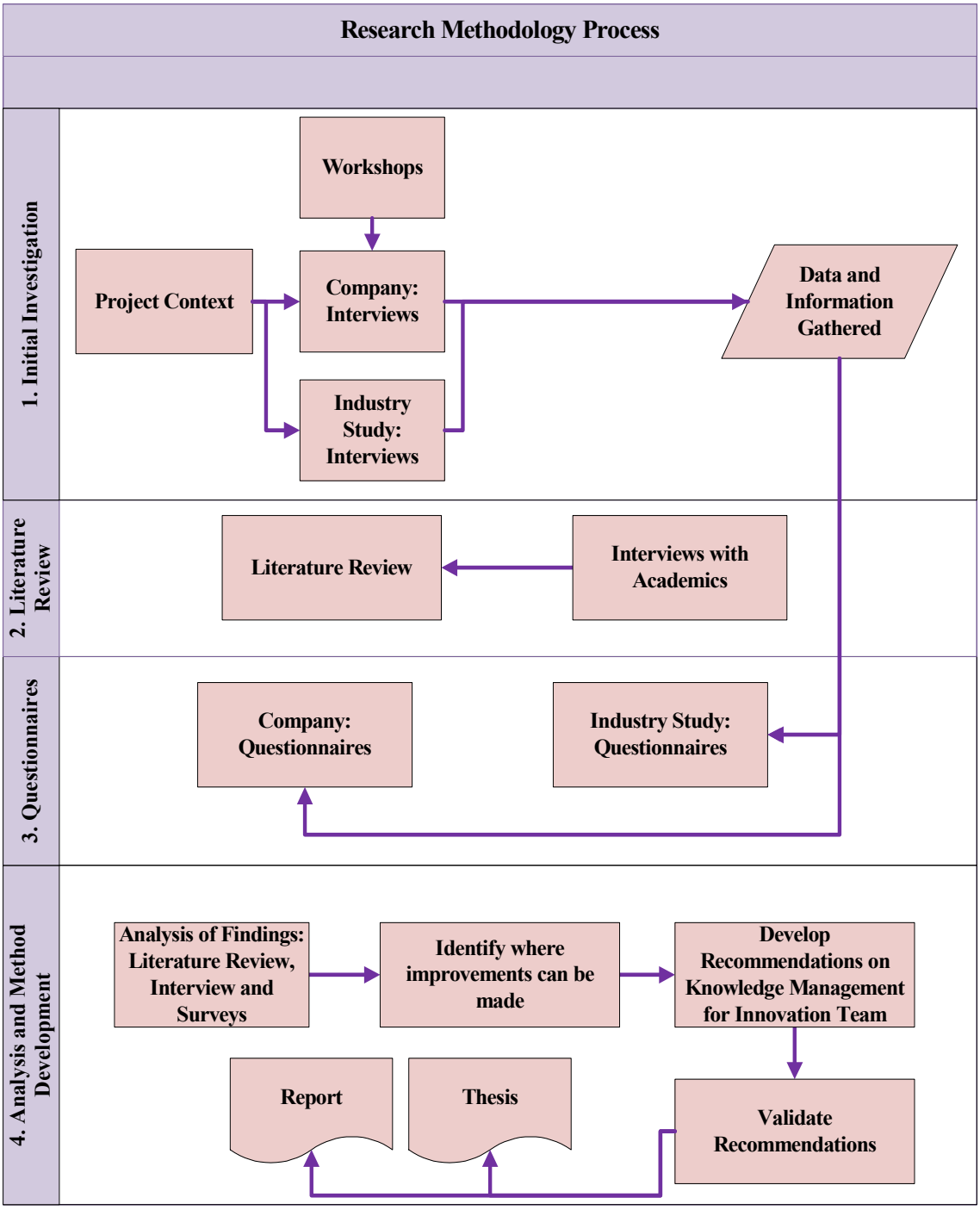

Figure 2.1: Research Methodology Process

2.3 Research Approach

The research approach adopted throughout this research was qualitative rather than quantitative. Qualitative methods are used to explore a subject and extract rich meaningful data (Robson, 2002). Quantitative data however provides a 'thin abstraction or description from results' and does not provide deep and meaningful answers (Dey, 1993). The aim of the project and the deliverables expected could only be achieved through interviews, observations and questionnaires. Interviews, observations and questionnaires proved to be the best suited approaches, to extract the required data and information and analyse it accordingly.

2.3.1 Phase 1: Initial Investigation

In order to understand the nature of the project and the deliverables expected, the project proposal was examined as well as preliminary open ended discussions and interviews with the company, where the research took place, were carried out. The use of open ended interviews allowed the author to explore the topic and gain a deeper understanding (Saunders *et al*., 2003) into the research from the perspective of the company employees. Following this, relevant details relating to the nature of the project were documented and the structure of how the research was to be carried out identified.

- **Interview Approach**

The research involved carrying out interviews with numerous employees at the company, academics and other organisations in an industry study. In order to ensure that the interviews were as productive as possible the interviewer prepared for them in several ways and took various variables into consideration. To establish a credible image in the eyes of the interviewees, the interviewer prepared for the interviews by reviewing the literature of the research project, in order to draw on this knowledge during the interview (Saunders *et al*., 2003) and acquired background information of the interviewees. During the interviews, a formal dress code was adopted; as this can affect the way the interviewee perceive the interviewer (Robson, 2002). The interviewer listened attentively and carefully (Torrington, 1991) and sensitive questions were asked towards the end of the interviews in order to build up trust and confidence between the interviewer and interviewee (Healy and Rawlinson, 1994).

- **Semi-Structured Company Interviews**

Semi-structured interviews were used for the company interviews with both the innovation team and the more general employees. Semi-structured interviews with involved the interviewer having a list of questions or themes (Saunders *et al*., 2003) which did not always follow a particular order and varied slightly from one interview to another. During the interviews, the most important points were documented in the form of bullet points. These bullet points were then later validated by the interviewee via email where they were free to add, subtract or change anything. This minimised interviewer bias (Easterby-Smith, M., *et al.,* 2002) because interviewees were given the opportunity to correct any misinterpreted points noted. Due to the amount of interviews that were conducted in such a short amount, this approach proved to be the most cost and time effective. This method of qualitative research through an exploratory study using semi-structured interviews allowed the interviewee to find out rich and in depth information, allowed the interviewee to probe answers and achieved a higher response rate though having more time and contact with the interviewees (Healey and Rawlinson, 1994).

Following the main interview, further follow up structured questionnaires were administrated with a small relevant sample size in order to extract more precise information relating to direct activities of the innovation team. These were conducted via telephone and email due to the sample size being small and the convenience of this method. It was an advantage that the interviewee had met the participants during the initial company interviews and so had developed a relationship with them making the second interview easier and the response rate high (Saunders *et al*., 2003).

- **Workshops**

The author attended a workshop as part of this project in order to gain a deeper understanding into a part of the research being investigated. Gill and Johnson (1997) categorise the roles the participant observer can adopt. The one which was adopted during this research was the participant as observer role. The participants of the workshop were aware of the role of the author as a researcher and that is was a fieldwork relationship (Ackroyd and Hughes, 1992). This activity allowed the author to

gain trust of the group and enabled further discussions and interviews to take place which were vital to the project.

2.3.2 Phase 2: Literature Review

- **Literature Review**

A literature review was carried out in order to provide the author with an understanding of the academic context of the work (Jankowicz, 2000), what had been researched in the areas and if any gaps existed where further research or a different insight was required. By doing this, the author identified what could be used from the academic literature and applied in the research as well as identifying what could be added from the research to the academic literature. The literature review also enabled the author to understand background knowledge on the research project which was useful for interviews and industry study. The way which the literature review was carried out is discussed in the literature review section.

- **Academic Interviews**

Semi-structured interviews/discussions were used for the academics interviews with the academics. As with the company interviews, the most important points from the interviews were documented in the form of bullet points. These bullet points were then later validated by the interviewee via email where they were free to add, subtract or change anything. Though the interviews, the academics provided the author with advice relating to the literature review and the project in general. Due to this, it was most cost and time effective to document the interview in the form of bullet points of the main themes during the interviews.

2.3.3 Phase 3: Industry Study

- **Industry Telephone Interviews**

Preliminary interviews were carried out with members of industry in order to gain an understanding into the research area in the context of other organisations. Telephone interviews are advantageous because they are associated with easier access, less cost

and are faster. They are more convenient and barriers such as distance and costs can be overcome. Although there may be issues such as establishing trust, asking sensitive questions and controlling the flow of the interview, which may be easier during face-to-face contact, in the context of this work the benefits far outweighed any potential challenges. To minimise any possible challenges, the interviewer networked with existing contacts and ensured that a follow-up telephone conversation was carried out to maintain a 'relationship' with the interviewee for future studies.

- **Industry Study**

An industry study was carried out, using structured questionnaires, following the preliminary industry interviews. These were conducted via email and several followed up with telephone calls. This method was more convenient and cheaper than face-to-face interviews.

2.3.4 Phase 4: Analysis and Method Development

Content analysis; 'a research technique for the objective, systematic, and quantitative description of manifest content of communications' (Berelson, 1952), was realised by the author to be a useful approach to analyse the information gathered. However, because there were not large amounts of information, and this approach is commonly used on large amounts of information, the author adopted a set of general qualitative analysis processes, as suggested by (Saunders *et al*., 2003). These include; 'categorisation, 'unitising' data, recognising relationships (and key points) and developing the categories used to facilitate this and developing and testing hypotheses to reach conclusions' (Saunders *et al*., 2003). All individual interviews throughout the project were validated but the general process of, 'developing and testing hypotheses to reach conclusions', was carried out after the framework had been developed and was validated.

2.4 Potential Risks

As with all research, risks may arise hence affecting the quality of the research and inevitably the results. Due to this, it was vital to identify any potential risks and develop contingency plans for them in order to ensure that the quality and results of the research

was not affected. The main potential risks were identified and plans out in place to minimise their impact:

Potential Risk	Monitoring Actions
Availability of company employees - The adequate amount of employees and customers being available to take part	Plan and organise company visits, arrange and confirm interviews prior to visits and ensure complete flexibility with participants
Interview bias - Some participants may have personal grudges or opinions about colleagues or work on a personal level hence affecting the objectivity of their answers. Interviewer bias may also affect the way in which participants respond (Easterby-Smith, M., *et al.,* 2002	Questionnaires and interview structures are designed and validated to extract quality data. Ensure that interviewer receives pre interview preparation and guidance on how to conduct interviews
Quality of data - Some participants may not whole heartedly complete the questionnaires or take part in interviews hence affecting the quality and depth of their answers	Ensure that the interviewer remains objective and plans questions to extract relevant information relating to the objectives of the project
Required data – Irrelevant data may be gathered due to not asking the right questions	Analyse data in stages to ensure that time is not wasted collected large amounts of unsuitable data
Lack of cooperation from other companies - Other companies may not want to take part in any interviews or questionnaires	Network with organisations both affiliated with Cranfield University and beyond which have an interest in the project topic as well as attend talks and workshops to network

Table 2.1: Risk Management

2.5 Summary

This chapter explained the anticipated research approach which was to be adopted during this work and justifications of why this was used. Investigating the different research methods enabled the author to choose and use the most appropriate ones for the context of this work. This chapter concluded by highlighting potential risks and challenges, which may have proved to be an obstacle in the research, and actions which were put in place to minimise them.

CHAPTER 3: LITERATURE REVIEW

3.1 Introduction

The aim of this project is to develop a knowledge management framework for an innovation team. This chapter begins with the definitions and characteristics of both knowledge management and innovation and highlights the relationship between the two. It then discusses innovation teams, the importance of post-project reviews and knowledge management and innovation frameworks. The chapter ends with identifying the research gap and summary.

3.2 Methodology

The aim of this work is to develop a knowledge management framework for an innovation team. The aim of the literature review is to evaluate and highlight relevant existing research which is significant and applicable to the research being carried out. The literature review allowed the author to provide a context for this research by looking at what work has already been done and identifying whether any gaps exist.

There has been a large amount of research carried out in the fields of knowledge management, innovation and the relationship and reliance between the two. Academic work has also been carried out on either knowledge management frameworks, innovation frameworks or integrated management frameworks. There have also been industrial case studies on similar types of innovation and teams to the ones this work will focus on but in all the cases the type of innovation is different depending on the nature of the business and sector it operates in. The nature of innovation and the context this work will investigating will be discussed in a forthcoming section.

The literature review provided the author with an academic background of the areas being investigated. This allowed the author to better understand the nature of the project being examined, highlighting the research gap and ultimately filling this gap by carrying out relevant research. Once key areas were identified through the project aim and context the literature review was carried out using four main approaches.

- **Databases:** Several databases were used and key search words were entered as shown in table 3.1.

Key Search Terms		
Innovation	**Knowledge Management**	**Other**
innovation	knowledge management	relationship AND knowledge management AND innovation
innovation AND enablers OR drivers	knowledge conversion	case studies AND knowledge AND innovation
innovation AND barriers	knowledge management AND tools OR techniques	framework AND knowledge management AND innovation OR innovation team
innovation AND activities	knowledge management taxonomy OR frameworks	Knowledge transfer AND teams OR innovation teams
innovation AND teams	knowledge sharing AND enablers OR activities	knowledge management AND teams AND innovation
innovation OR innovation teams AND activities	tacit knowledge OR tacit knowledge transfer AND meetings	meetings AND knowledge outputs
innovation teams AND outputs	knowledge management AND innovation activities	post project OR post meeting AND reviews OR follow ups

Table 3.1: Key Search Terms

The main sources which were used to search for relevant literature were:

- Emerald Insight
- InterScience Wiley
- EBSCO Host
- Elsevier Science journals (via Science Direct) (ATHENS)
- Business Insights – case studies
- Cranfield School of Management Publications Database
- Google Scholar
- Cranfield University Library

- Cranfield University Library Website
- ISI Web of Knowledge
- Social Science Research Network
- The ACM Digital Library

From the twelve search resources which were used, all the search terms were searched for in the first four search resources only. From the search results of these four search resources, the filtering strategy was then applied, narrowing down the results appropriately, as explained below. The other eight search resources were used to either follow up references from academics, other references such as webpages, books or journals or to randomly search for relevant resources.

➢ **Filtering Strategy**

In order for only relevant information to be used for the literature review, several techniques were applied. Initially, when searching for relevant literature, approximately one hundred and fifty papers were found, using the search resources mentioned above. These were then narrowed down to approximately eighty using the filtering strategy; where the author first read the title and more importantly the abstract or introduction as an indication of how relevant the information was. This allowed the author to assess if the article or information was relevant for the literature view. If the title, abstract and introduction appeared to be relevant the author proceeded to use the information for this work.

➢ **References from other journals**

On location of suitable and applicable articles, the author referred to the list of references from that article.

For example, the author used Emerald Insight database (www.emeraldinsight.com) to search for articles relating to knowledge management and innovation by using the search terms, 'knowledge management *and* innovation'.

One of the articles found through the filtering strategy was:

Du Plessis M., 2007. The role of knowledge management in innovation. *Journal of Knowledge Management,* Volume 11, Number. 4, pp. 20-29.

The author then used the references section of this article to search for other relevant articles based on the title of them. Seven relevant articles were then searched for, the abstracts read but only number four from the results below was used in this work because it were the most relevant and useful. Although the others were read for the purpose of further reading they were not directly referenced in this work.

1. Badii A., Sharif A., 2003. Information management and knowledge integration for enterprise innovation. *Journal of Logistics Information Management* Volume: 16, Issue: 2, pp. 145-155.

2. Cardinal, L.B., Allessandri, T.M., Turner, S.F. 2001. Knowledge codifiability, resources, and science based innovation, *Journal of Knowledge Management*, Vol. 5 No.2, pp.195-204.

3. Cavusgil, S., Tamer, R., Calantone, J., Zhao, Y. 2003. Tacit knowledge transfer and firm innovation capability, *Journal of Business and Industrial Marketing*. Volume 18 Number 1, pp.6-21.

4. Darroch, J., McNaughton, R. 2002. Examining the link between knowledge management practices and types of innovation. *Journal of Intellectual Capital*, Volume 3, Number 3, pp.210-22.

5. Gloet, M., Terziovski, M., 2004. Exploring the relationship between knowledge management practices and innovation performance. *Journal of Manufacturing Technology Management*, Volume 15, Number 5, pp. 402-409.

6. Herkema, S. 2003. A complex adaptive perspective on learning within innovation projects. *The Learning Organization*, Volume 10, Number 6, pp.340-6.

7. , H. 2003. Knowledge management, HRM and the innovation process, *International Journal of Manpower*, Volume 24, Number 5, pp.501-16.

- **Recommendations from academics**

The final approach which was used in identifying relevant literature was through recommendations from academics. Several academics such as the project supervisor and academics in the areas of knowledge management and innovation were interviewed in order to gain their insight into these areas and provide advice. The questions were semi structured (see Appendix) to gain both their academic insights and opinions into the research area as well their recommendations. Relevant and applicable results from the outcomes of the literature review were then extracted and put together in the sections below.

3.3 Knowledge Management

The meaning and interpretation of what knowledge management is depends on the individual or organisation defining it (Barth, 2000). The most suitable definition of knowledge management in the context of this research is that, '…knowledge management is the set of proactive activities to support an organization in creating, assimilating, disseminating, and applying its knowledge' (Hussain *et al.,* 2004).

Knowledge management ensures that an organisation's performance is continuously improving through effective and available knowledge sharing procedures and culture, identifying knowledge leaders and workers (Drucker, 1999). Knowledge management, tools, processes and platforms facilitate, 'reflection and dialogue to allow personal and organizational learning and innovation' (Du Plessis, 2007). It is essential that an organisation manages both their tacit and explicit knowledge to ensure their organisational knowledge is put to as best use as possible. Lubit (2001) argues that tacit knowledge entails 'information that is difficult to express, formalize, or share' and is invaluable to an organisation because it is unique. Conversely, explicit knowledge is collected knowledge which has been codified in forms such as manuals, booklets and procedures so that it can be shared and understood collectively (European Committee for Standardization, 2004).

Nonaka *et al.,* (2000) explains that knowledge could not be 'managed' and had to be 'led' through creating and managing the 'Ba'[2] for knowledge creation and transfer. Nonaka and Takeuchi's SECI model, illustrates how individuals tacit knowledge is shared and converted from tacit knowledge to explicit knowledge and vice versa (Figure 3.1). The socialization phase enables individuals to share their experiences, ideas and knowledge and is vital for individual learning and increasing an organisation's knowledge base.

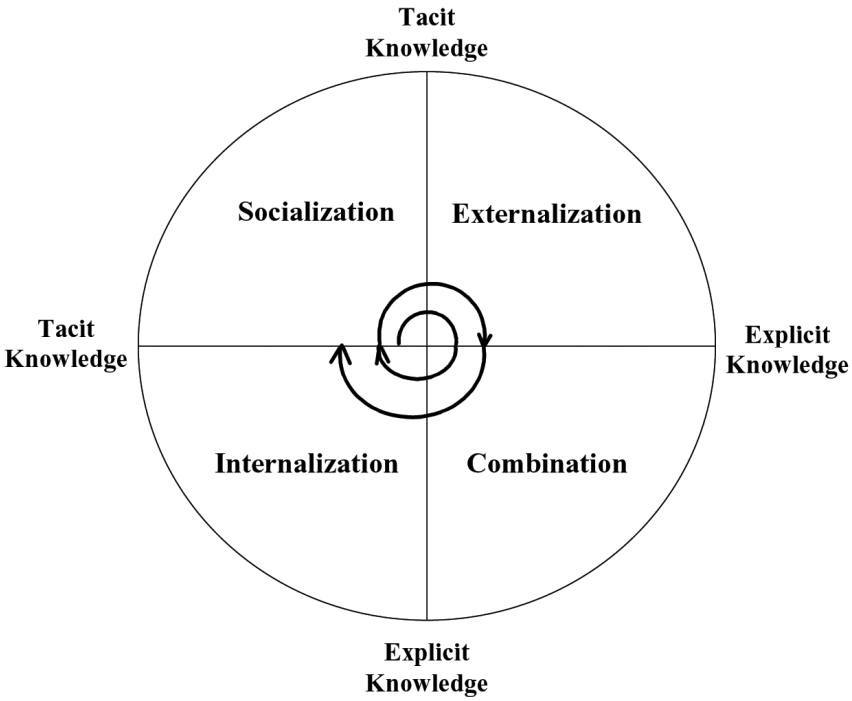

Figure 3.1: SECI model Nonaka and Takeuchi (Li and Gao, 2003)

Li and Gao (2003) explain that a company's competitiveness is improved through continuous learning involving knowledge creation and transfer (Figure 3.2). Their study of Japanese manufacturing companies found that the theory of knowledge creation

[2] '…a shared context in which knowledge is shared, created and utilised. In knowledge creation, generation and regeneration of ba is the key, as ba provides the energy, quality and place to perform the individual conversions and to move along the knowledge spiral' (Nonaka *et al.,* 2000).

(Nonaka and Takeuchi, 1995) explained how the dynamics of continuous innovation were created and sustained through the existence of shared rich personal tacit knowledge. Haldin-Herrgard (2000) highlights that tacit knowledge is the differentiator between organisations but emphasises that it is difficult to share and use. In his view, methods such as, 'direct interaction, networking and action learning that include face-to-face social interaction and practical experiences' are key to sharing tacit likewise are team work and 'active contribution of the learner' to learning knowledge.

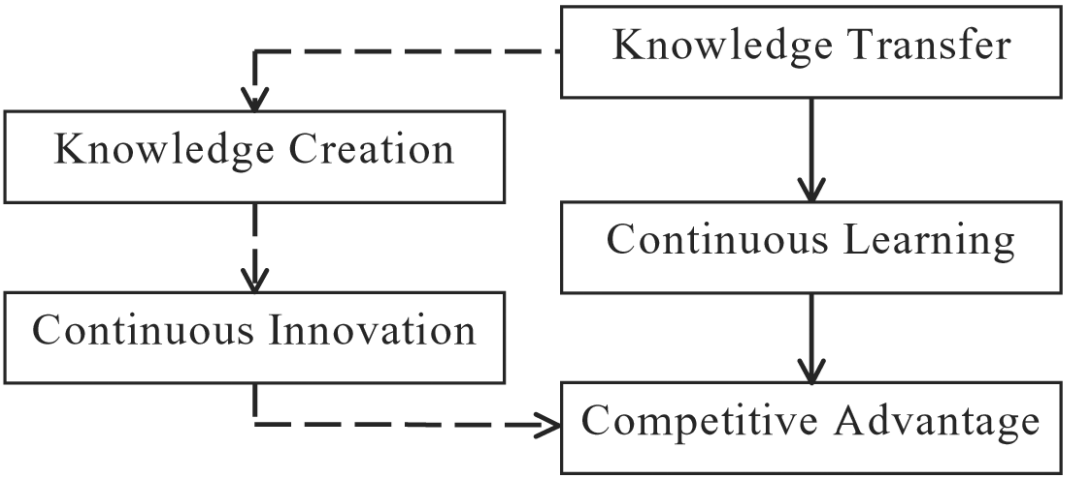

Figure 3.2: Knowledge Transfer and Competitive Advantage (Li and Gao, 2003)

Bröchner *et al,.* (2004) carried out a study on cross-border post acquisition construction companies to determine the influence of technical and cultural heterogeneity on knowledge transfer. Similar to Haldin-Herrgard (2000) Bröchner *et al,.* (2004) too found that face-to-face meetings were perceived as the best knowledge transfer mechanism. Email and technical business gatherings, including key client, to enable the exchange ideas, socialise and strengthen relationships were also perceived as key to knowledge transfer. They add that by appointing a facilitator at the initial stages of a project, department knowledge could be accessed and updated. However, Bröchner *et al,.* (2004) emphasise that measuring knowledge transfer and in particular, 'quantifying the link between knowledge transfer and learning' is a crucial and difficult task in organisations.

Earl (2001) proposes that knowledge management can be categorised into schools or strategies (Figure 3.3). He explains that the purpose of the framework is to direct managers on choices to begin knowledge management projects according to, 'goals, organizational character, and technological, behavioural, or economic biases.' The seven schools of knowledge management illustrate that knowledge management has a variety of attributes and can be done in different ways depending on the nature of their organisation and the sector that they operate in. The taxonomy allows organisations to identify how to make knowledge management work and if necessary take a different approach to their knowledge management strategy. He does highlight that further research is required around the taxonomy answering questions such as; if one school is more effective than another or if some schools 'coexist' better than others. Earl (2001) did not however specify if an organisation can follow one school of knowledge management and as it evolves over time and grows move to another school or if different business units within the same organisation can adopt different knowledge management schools.

SCHOOL / ATTRIBUTE	← TECHNOCRATIC →			← ECONOMIC →	← BEHAVIORAL →		
	SYSTEMS	CARTOGRAPHIC	ENGINEERING	COMMERCIAL	ORGANIZATIONAL	SPATIAL	STRATEGIC
FOCUS	Technology	Maps	Processes	Income	Networks	Space	Mindset
AIM	Knowledge Bases	Knowledge Directories	Knowledge Flows	Knowledge Assets	Knowledge Pooling	Knowledge Exchange	Knowledge Capabilities
UNIT	Domain	Enterprise	Activity	Know-how	Communities	Place	Business
EXAMPLE	Xerox Shorko Films	Bain & Co AT&T	HP Frito-Lay	Dow Chemical IBM	BP Amoco Shell	Skandia British Airways	Skandia Unilever
CRITICAL SUCCESS FACTORS	Content Validation Incentives to Provide Content	Culture/Incentives to share Knowledge Networks to Connect People	Knowledge Learning and Information Unrestricted Distribution	Specialist Teams Institutionalized Process	Sociable Culture Knowledge Intermediaries	Design for Purpose Encouragement	Rhetoric Artifacts
PRINCIPAL IT CONTRIBUTION	Knowledge-based Systems	Profiles and Directories on Internets	Shared Databases	Intellectual Asset Register and Processing System	Groupware and Intranets	Access and Representa-tional Tools	Eclectic
"PHILOSOPHY"	Codification	Connectivity	Capability	Commercialization	Collaboration	Contactivity	Consciousness

Figure 3.3: Schools of Knowledge Management (Earl, 2001)

Hansen *et al.,* (1999) studied knowledge practices at management consulting firms, health care providers and manufacturers of computers. They found that in companies

that provided, 'standardized products' knowledge was codified and stored in databases allowing the data to be accessed at any time but any member of the organisation. They called this the 'codification strategy.' On the other hand, companies that provided 'highly customized solutions to unique problems', knowledge was shared between 'person-to-person contacts' and computers were only used to help people to communicate knowledge but not to store it. They called this the 'personalization strategy.' Hansen *et al.,* (1999) maintain than a company must choose a knowledge management strategy which fits with their competitive strategy and their goals and needs. They argue that depending on the company one strategy or the other will exist, however this goes against many views which reinforce that both an IT infrastructure, allowing codification, and an open knowledge sharing culture, allowing personalisation, must be in place for effective knowledge management (Du Plessis, 2007).

3.4 Innovation

It is important firstly to differentiate between creativity and innovation because an organisation can be creative but not necessarily be able to exploit this creativity though the process of innovation. The Cox Review (2005) defined creativity as the, 'generation of new ideas either new ways of looking at existing problems, or of seeing new opportunities, perhaps by exploiting emerging technologies or changes in markets.' In the context of this work innovation is best defined as, 'the successful exploitation of new ideas… the process that carries them through to new products, new services, new ways of running the business or even new ways of doing business' (Cox Review, 2005).

Innovation is not only about the ability to produce an idea; it then requires transforming that idea into a successful value proposition which creates added value for an organisation. Innovation involves many more variables than an idea and exploitation of this idea and has often been described as a complex process (Harkema and Browaeys, 2002). Nonaka (1994) argue that organisational knowledge and learning are vital in the innovation process, as innovation is predominantly a process of knowledge creation which relies heavily on the availability and readiness of knowledge.

Innovation involves people and groups of people who interact with each other, share and produce knowledge through innovation enablers such as technology (Drew, 2006)

and create ideas from knowledge. This requires interaction through a process of organisational and individual learning in an organisation. This process can be described as 'knowledge exchange'; with continuous 'feedback loops' between individuals within the organisation and between individuals in the external world. It is vital that an organisation has high absorptive capacity and the ability to identify knowledge which is 'fit' for the purpose of the organisation in order for innovation to then flourish (Harkema and Browaeys, 2002). However, due to innovation being intangible, in some companies more than others, this makes it exceedingly difficult for an organisation to measure the benefits it may bring. There have been numerous views on how to measure the benefits of innovation, such as valuing the introduction of new products or processes, the percentage of sales from the introduction of new or improved products or processes, the number of intellectual property patented or by using econometric techniques to relate innovation indicators to firm performance (Rogers, 1998).

3.5 Innovation Teams

Teams in organisations can come in many forms and sizes depending on the nature of the work and the organisation itself. Virtual teams for example are groups of organisationally or geographically spread co-workers which are put together using telecommunications and information technologies to accomplish a certain task or job (Malhotra *et al.,* 2007). However, innovation teams differ depending on, the activities they carry out, the purpose of the teams and the context of innovation in the specific business unit or organisation. DeCusatis (2008) provides an insight into the strategies which make some teams produce more useful innovations than others by describing a framework explaining how the characteristics of innovators can be classified into different kinds of teams. Additionally, staffing and selection of the people to run the innovation process in innovation teams has, 'hardly been discussed in the innovation literature' (Buijs, 2007).

Innovation teams like any other team are different depending on the nature of the organisations and the project or problem being faced. For example at Xilinx, a company in the semiconductor industry, innovation revolves around teams. They recognise that their teams make up many different people with many different skills. In the design teams there are people that have the ideas, the people who are, 'good at evaluating the

ideas and driving them down towards a solution and the people who turn the concept for a solution into an actual design.' 'There are then people that can turn the design into early samples such as project management people who can coordinate the inputs of the software, fabrication, design and customer applications engineers, with skills that can be quite far removed from the teams that have the ideas to begin with.' Xilinx recognises that all these different people who make up a team are key to innovation (Leavy, 2005).

Large companies such as Toyota, P&G, 3M, IBM and Sony have specific innovation teams dedicated to be available all the time. Procter & Gamble and Google are passionate supporters of organising for innovation via 'co-location.' For example, IBM put together a globally constructed innovation teams which made up 400 team members and was responsible for developing, amongst others, the high-performance chip for Sony's Playstation 3. Procter & Gamble has an organisation of central innovation teams at the corporate level which is known as 'Future Works' whereas at the business unit level its central innovation teams come under the name of 'New Business Development Organization' (Wentz, 2008).

3.5.1 Post-Project Reviews

The design of organisational work teams and groups affects the way in which knowledge is transferred and is a valuable platform to exchange both tacit and explicit knowledge (Lubit, 2001). Since innovation teams like any team undertake tasks and projects it is important to not only manage knowledge during the project, task or session but also following the completion of the project. This will ensure that both the explicit knowledge, from the team or project, is documented and disseminated but also that the tacit knowledge and individual experiences are shared and communicated. In order to assess the benefits gained from a project, experience or from their employees' respective job roles it is vital that an organisation measures what individuals have learnt and continue to learn both tacitly and explicitly. Koners and Goffin (2007) explain that post-project reviews (PPRs), 'a formal review of the project which examines the lessons which may be learnt and used to the benefit of future projects' (Lane 2001), are a valuable way to capture knowledge which has been generated in a new product development.

Koners and Goffin (2007) highlight that most researchers focus on documenting knowledge and sharing and fail to realise that there is 'more to learning' that what has been documented in reports or otherwise. They carried out research on five companies from different sectors to assess how R&D companies carry out post-project reviews and if they 'promote the creation and transfer of tacit knowledge.' From the recommendations they make to practitioners, they highlight that the people which attend the reviews, the time, location, duration as well as the preparation for a post-project review are vital. About six months after a project, a 'professional or skilled moderator can be used in a post-project review to create the right atmosphere and guide discussion using tools such as cause and effect diagrams to generate and assist in knowledge exchange. Von Zedtwitz's (2002) study too found that Agilent[3] emphasised the importance of inviting cross-functional participants to post-project reviews to, 'enhance the array of issues raised'. Koners and Goffin (2007) further explain that presenting the results to other project teams rather than producing reports is a more effective method than documentation and stimulates social interaction. They conclude that management should encourage informal interactions, storytelling and the use of metaphors to disseminate and share tacit knowledge and improve organisational learning. Since a post-project review is a meeting, made up of people coming together for a certain purpose, the author strikes a comparison between a PPR and a 'innovation booster' which will be discussed in a Chapter 4.

3.6 Knowledge Management and Innovation

The 'right' knowledge and effective knowledge management act as enablers for innovation in an organisation. Knowledge management aids innovation by providing platforms and tools allowing knowledge to be shared such as through idea sharing schemes via an intranet. Knowledge management can assist in gathering tacit knowledge, internal and external to an organisation through the application of processes which ensure that knowledge is available for innovation teams hence reducing the costs and risk of innovation (Du Plessis, 2007). By identifying knowledge champions or leaders, knowledge which may be otherwise be lost is retained and shared throughout

[3] Agilent or Agilent Technologies is a U.S based measurement and instrument company.

the organisation (Cook, 1999). Knowledge champions ensure that, 'knowledge is leveraged into profitable innovations' and that they have access to social and professional networks both internally and externally to the organisation. Additionally, knowledge management can also aid collaboration and promote innovation through the technological platforms and tools. This enables knowledge sharing across organisational communities thought platforms such as, 'online discussion forums' (Du Plessis, 2007).

Successful knowledge management also ensures that tacit knowledge is codified and translated into an explicit form in order to make the innovation processes more efficient by facilitating collaboration and ensuring knowledge is available in an accessible format (Du Plessis, 2007). However, in saying this it is not always an easy task to not only capture tacit knowledge but then attempt to transfer this into some explicit form. Walsham (2001) argues that sharing tacit knowledge is extremely difficult across different cultures and across an organisation and replicating tacit knowledge into an explicit form can be hindered by many factors. Walsham (2001) explains that although, 'information and communication technologies are not *the* answer to improved knowledge sharing within and between people and organisations,' and 'do not replicate or replace the deep tacit knowledge of human beings which lies at the heart of all human thought and action.' '…they can support the development and communication of human meeting.'

3.6.1 Knowledge Management and Innovation Case Studies

Siemens (Goh, 2005)

Siemens is a leading technology company providing innovative solutions to help to answer the world's industrial challenges. Siemens strongly believe that if an organisation wants to successfully innovate it needs knowledge to create new ideas and good knowledge management practices to successfully innovate.

Siemens successfully does this with its technological infrastructure which brings employees' abilities and ideas together. Each employee is involved in sharing knowledge and being part of the knowledge networks across the organisation. For example, Siemens keeps its patent portfolio up-to-date and publicises it to enhance corporate competitiveness.

Knowledge management is embedded in the internal processes of the organisation's innovation management structure. This starts from the beginning when ideas are generated to the experimentation of prototypes and product launches. These stages are key factors which contribute to the success of the organisation and ensure that knowledge is available for the innovation process. This integration of knowledge management practices into innovation management processes has thus ensured that Siemens maintain its leadership position as a modern electronics innovator.

Best Practice Report 'Using KM to Drive Innovation' (APQC - American Productivity and Quality Centre 2003)

The APQC conducted a study to explore how 'innovative organisation manage their knowledge and how to approach knowledge management to drive innovation.' The study, conducted over a six month period, involved 30 sponsor organisations ranging from Xerox Corporation to Renault S.A. and 7 best-practice partner organisations ranging from The World Bank to NASA and the Jet Propulsion Laboratory.

The APQC found 15 patterns and insights about the innovative organisations in the study. This included proficient management of technical and scientific information, human resource practices, building social capital to encourage idea sharing and efficient innovation emphasising on 'knowledge management to become more efficient innovators.' In conclusion, the study found that the innovative organisations involved in the study; create, manage or leverage their knowledge more effectively than other organisations. This reflects the academic literature and research which highlights that effective knowledge management and integrated knowledge management practices lead to both innovative processes and an innovative organisational culture.

3.7 Knowledge Management and Innovation Frameworks

Several knowledge management *and* innovation frameworks and few knowledge management *for* innovation frameworks have been developed, including Goh's (2005) integrated management framework for knowledge management and innovation and Mentzas's (2003) 'know-net' framework. Additionally, various consultancies and organisations, including Innovation Framework Technologies and IBM, have developed innovation and knowledge management frameworks in the context of their

organisations. However, in saying this, there is little that explains a knowledge management framework *for* an innovation team or more specifically an innovation team's activities. This section explains the knowledge management for innovation framework developed by Kong and Li (2007), the integrated model of knowledge-based innovation by Chen (2007) and the integrated management framework for knowledge management and innovation by Goh (2005).

Kong and Li (2007) developed a conceptual model (Figure 3.5) illustrating the '...co-evolution of exploitative and exploratory innovation and knowledge management...' highlighting that knowledge management is a precursor to innovation. Kong and Li (2007) explain from the work of Benner and Tushman (2001) that exploitative innovation capabilities are incremental and build on existing knowledge whereas exploratory innovation capabilities are radical which need new knowledge. Kong and Li (2007) further explain that innovation is a knowledge management process involving the creation, sharing and application of knowledge in innovation. They highlight that 'innovation management' includes organisational processes which require a mix of 'knowledge management resources to extract new value from organisational knowledge assets.'

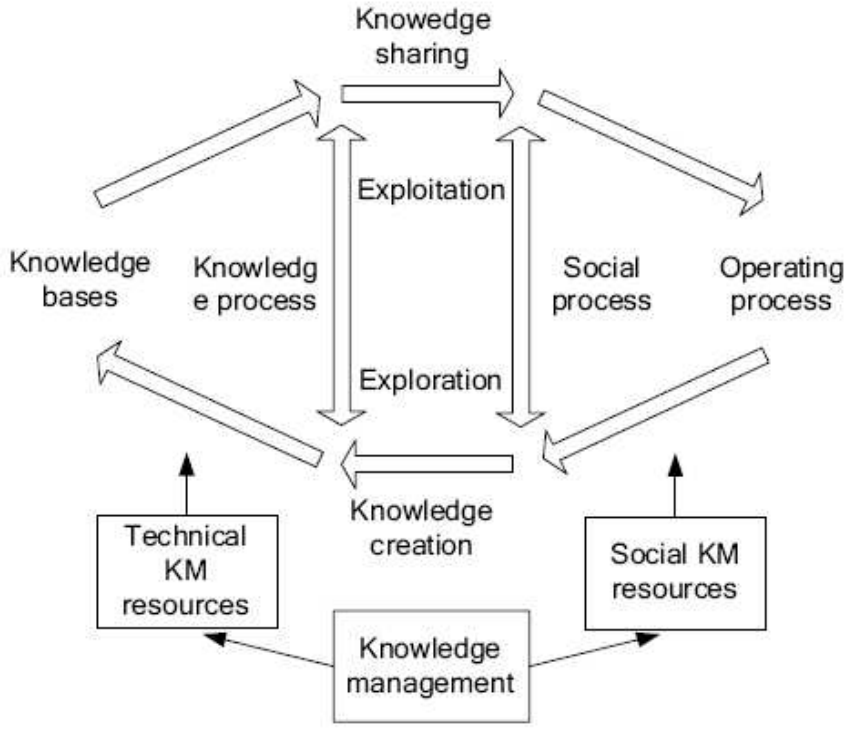

Figure 3.4: An Integrated Model for Innovation Management (Kong and Li, 2007)

Kong and Li (2007) conclude; that organisations must ensure that they arrange and stimulate their knowledge management resources through channels such as their IT infrastructure, human capital, informal social relationships and their organisational structure and culture, to meet the requirements of innovation hence allowing it to thrive. However, organisations must also be cautious that they simply do not introduce an IT infrastructure as a solution to more effective knowledge management. This can cause confusion and crisis amongst employees and have the opposite effect that was intended (Mantovani and Spagnolli, 2001).

Goh (2005) suggested that organisations should integrate knowledge management and innovation into a single management framework; knowledge innovation, illustrated in Figure 3.5. Amidon (1997) defined knowledge innovation as, 'The creation, evolution, exchange and application of new ideas into marketable goods and services, leading to the success of an enterprise, the vitality of a nation's economy and the advancement of society.' Knowledge innovation includes integrating three aspects of management to enable knowledge-centred principles, knowledge-sharing infrastructures and knowledge-based initiatives in order to effectively generate knowledge for innovation (Goh, 2005).

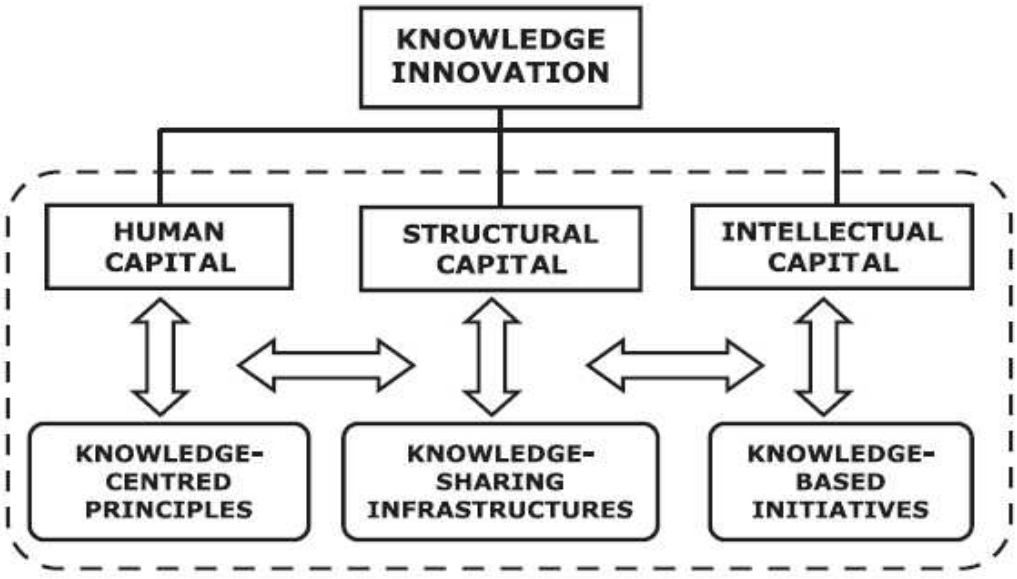

Figure 3.5 An Integrated Management Framework (Goh, 2005)

Scarborough (2003) explains that knowledge management allows individuals to form social networks and engage in collaborative experiences. Knowledge sharing tools enable knowledge sharing communities to be formed, timely access to knowledge leaders and up-to-date knowledge shared though blogs and discussion groups. This also allows individuals to form closer social bonds hence promoting an open, creative and friendly working environment which are relevant to the innovation process.

Chen (2007) carried out a study on, 'Knowledge-Based Innovation Capacity and Innovation Supply Chain' in the context of Taiwanese High-Tech SMEs (small and medium enterprises). Chen (2007) explains that the Taiwanese industry places a high emphasis on knowledge management and views it as an important management tool. He highlights that although Taiwanese industries have understood the importance of knowledge management they have still not grasped how to implement knowledge management for innovation.

Chen (2007) uses Carnegie and Butlin's (1993) definition of innovation as, "something that is new or improved done by an enterprise to create significant value-added either directly for the enterprise or its customer" and Livingstone's *et a.l,* (1998) definition that innovation is "new products or processes that increase value, including anything from patents and newly developed products to creative uses of information and effective human resource management systems". Chen (2007) uses this definition of innovation coupled with Sveiby's (2001) concept of a knowledge based strategy and expands them into the definition of knowledge-based innovation. Chen (2007) defines knowledge-based innovation as, "something that is new or improved, undertaken by an enterprise to create significant value-added either directly for the enterprise or its customer, partners and suppliers."

Chen (2007) developed two modified integrated innovation models; one for smaller SMEs (small and medium enterprises) and one for larger SMEs (small and medium enterprises). For the context of this work, the modified integrated innovation model for larger SMEs (Figure 3.6) is more applicable because it illustrates cyclical synergy between internal and external support process rather than partial synergy and is more relevant to the size of the organisation relating to this work. The models were developed as a result of the analysis and results of case studies from company information,

interview questionnaires, in-depth interviews, cross case analysis and the comparison of four case studies and interpreted the results from qualitative data. The integrated innovation model illustrates that sustainable innovation and value creation requires internal support processes such as a cultivating innovation culture and knowledge innovation as well as external support processes such as an e-knowledge network and innovation network. The corporate values, vision and mission should support innovation, allow for it to be accumulated from different sources, circulated around the organisation and for it to be continuously updated. Chen's (2007) work provides an integrated innovation model and useful suggestions for high-technology SMEs in Taiwan, surrounding knowledge-based innovation. The research highlights that particularly high-technology SMEs need to construct their knowledge-based innovation framework systematically and integrating innovation sources and supporting processes into it.

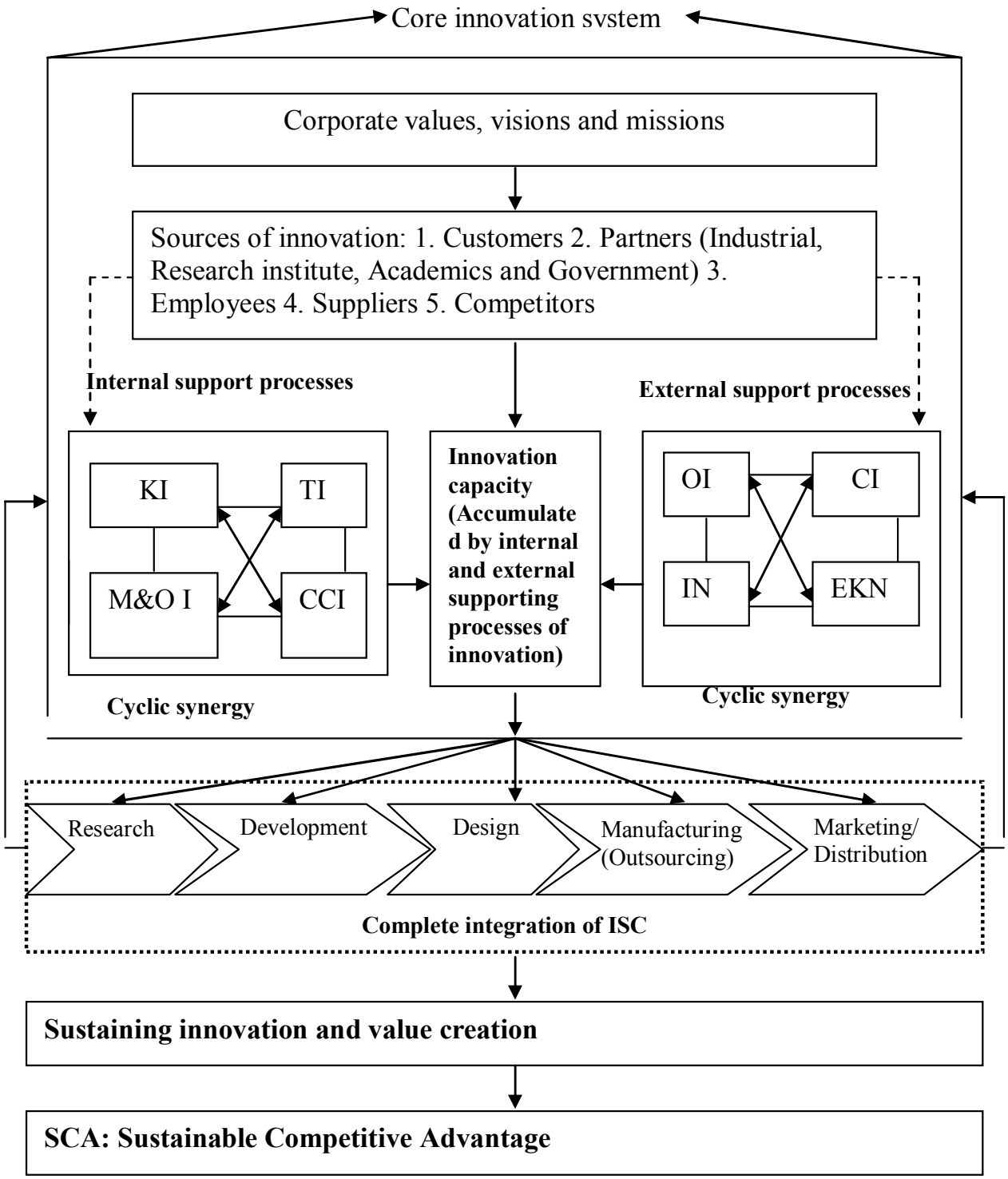

Figure 3.6: The Modified Integrated Innovation Model for Larger SMEs (Chen, 2007)

Note: KI= Knowledge Innovation, TI= Technological Innovation, M&O I= Managing& Organizing Innovation, CCI= Cultivating Culture Innovation, OI= Open source/ market Innovation, CI= Cooperation Innovation, IN= Innovation Network, EKN= E-Knowledge Network, ISC= Innovation Supply Chain, SCA= Sustainable Competitive Advantage.

3.8 Research Gap

Knowledge management and innovation have been discussed in this chapter, as well as knowledge management *and* innovation and *for* innovation frameworks. Although, Chen 's (2007), Goh's (2005) and Kong and Li's (2007) work provide useful integrated management frameworks they do not provide this specifically for an innovation team or an innovation activity but rather on a more broader organisational level. Knowledge management is vital for individuals and teams in organisations and will enable them to share knowledge, ideas and experiences more effectively hence enabling a more innovative culture. However, the nature of teams and certainly innovation teams is company specific and it may be for this reason that the literature does not specify a knowledge management framework for an innovation team or their activities, such as the one in the context of this project. The literature does not specifically provide a knowledge management framework detailing *how* an innovation team can utilise knowledge management and ultimately ensuring that the services they provide enable more innovative activities and are more successful. This project intends to provide a case study example of an innovation team and their activities and develop a knowledge management framework for the innovation team's core activity to enable them to be more effective in the way in which it is planned, carried out and followed up.

3.9 Summary: Implications for Practice

This chapter has detailed academic literature on knowledge management and innovation, the relationship between the two, case studies, knowledge management and innovation frameworks and innovation teams. In the context of this project the author will draw on academic work from this chapter including the benefits of knowledge management for innovation, the importance of post-project reviews and meeting as tacit knowledge transfer activities and enablers of innovation such as technology and networking. These will then be used to develop a knowledge management framework for an innovation team's activities. The framework will illustrate *how* to use knowledge management activities for an innovation team for example, through utilising knowledge management tools (Du Plessis, 2007), organised post-project reviews (Koners and Goffin, 2007) and enabling effective tacit knowledge transfer (Haldin-Herrgard, 2000).

CHAPTER 4: CASE STUDY

4.1 Introduction

The aim of this work is to develop a knowledge management framework for an innovation team. The aim of this chapter is to provide a case study of the company, explain how the research was carried out and with who the interviewees were, and how the process of the project changed as a result of the research. The knowledge management framework for the innovation team was developed following the completion of a number of phases including an initial investigation, literature review, industry study and analysis of the results and method development.

The most suitable definition of knowledge management in the context of this research is that, '…knowledge management is the set of proactive activities to support an organization in creating, assimilating, disseminating, and applying its knowledge' (Hussain *et al.,* 2004). Innovation requires the involvement of people (Thompson 2004), technology (Drew 2006) and an organisational learning culture (Nonaka, 1994). In this context innovation is best defined as, 'the successful exploitation of new ideas… the process that carries them through to new products, new services, new ways of running the business or even new ways of doing business' (Cox Review, 2005). The literature review also discussed the benefits of utilising knowledge management for innovation and the importance of post project reviews, and meetings to disseminate knowledge, and learn from cross project experiences. Taking the literature review, the research carried out and the deliverables expected by the company into account, a knowledge management framework for an innovation team was developed.

4.2 Innovation Office

As mentioned in Chapter 1, in the context of this project, this project focused specifically on the innovation team or office at MBDA.

The innovation office set out to achieve various objectives including:

- Consistently managing existing and future innovation programmes

- Proactively promoting innovation Excellence to enhance added-value within all MBDA projects
- To encourage all stakeholders to adopt innovation excellence with the characteristics embedded in MBDAi
- To promote international recognition of MBDA as a best-in-class, innovative company
- To promote and develop innovation techniques and tools through training and benchmarking to sustain a best-in-class position for MBDA as an innovation leader

The innovation office intends to achieve these objectives through achieving aims such as:

- Establishing a strategic innovative culture change
- Communicating campaigns on innovation across MBDA
- Making innovative skills a core competency
- Ensuring that all employees receive training of creative problem solving methods and innovation tools and techniques
- Restructuring the innovation intranet site and supporting knowledge management tools
- Strengthening and promoting the innovation office and open innovation

The innovation office at MBDA, aims to promote innovation through various innovative activities and use innovation as a differentiator to achieve sustainable competitive advantage. This work was prompted because the innovation team felt that they could improve their activities and reach higher standards. Consequently, this project was carried out and a knowledge management framework for the innovation team developed.

4.2.1 Main Innovation Activity

As stated in Chapter 1, the innovation office engage in numerous activities such as communicating campaigns, making innovative skills a core competence, ensuring that all employees receive training of creative problem solving techniques, restructuring the innovation intranet site and other supporting knowledge management tools. However, their *main* or *core* activity is to organise and execute innovation boosters. The innovation boosters use creative problem solving techniques to enable participants to think 'outside the box' while thinking and solving problems.

An innovation booster at MBDA can be described as:

- A kind of workshop but more specific using creative problem solving techniques. *(Head of innovation, knowledge management, intellectual property and technical institute).*
- A more efficient workshop using creative problem techniques and facilitators to maximise efficiency *(Innovation manager U.K.).*
- A method of exploring a 'problem statement or investigate a specific topic' with the assistance of colleagues with varying backgrounds *(Principal Engineer).*

However the head of innovation, knowledge management, intellectual property and technical institute, did add that, people need to be aware that the innovation team do not only provide boosters, they provide other type of services which are tailored (content / duration) to the customer's request. Due to the fact that the innovation boosters are the main activity of the innovation office, this was the primary focus in this project. However innovation[4], knowledge management[5] and numerous factors which may affect

[4] The innovation team promote and execute their innovation services across MBDA with the intent that this will enable MBDA as an organisation to become more innovative and competitive. However, it must be highlighted that innovation within MBDA has been embedded in the organisation in terms of their engineering, manufacturing and design for many years. The innovation office however aim to enable employees across MBDA to adopt techniques and training which will ensure the longevity of innovation in their work and enable MBDA to remain competitive in the fiercely competitive defence sector. In this way innovation within MBDA can be seen as two tiers, one is being what the innovation office promotes and delivers and the other being innovation through processes, products and services across MBDA.

the work of the innovation office across MBDA were also investigated. Innovation managers as lead facilitators have been trained by an international management consultancy specialising in creativity and innovation management.

➢ ***The participants of a booster usually include:***

- **Lead facilitator** – Consults with the problem owner to define the issue, innovation booster objectives, monitoring and evaluating the outcomes. The lead facilitator managing the innovation processes in the boosters as well as ensuring that creative problem solving techniques are being used to help to solve the 'issue' or 'problem.'

- **Support facilitator -** Supports the lead facilitator who may be either new to facilitating boosters or the group may be large in size and the issue being addressed complex. A support facilitator is not always present; this depends on each individual booster, the size of the session and complexity.

- **Problem owner –** An employee internally within MBDA who is faced with a technical problem and wishes to use a booster and creative problem solving techniques to enable idea and solution generation. He/she approaches the innovation office with an 'issue' or 'problem' and requests relevant individuals to come together and understand how to use creative problem solving techniques and apply these to solving the technical problem or broaden their thinking after the booster. However, the attendance of a booster by a 'problem owner' does not necessarily mean that a solution will be found. The booster can simply provide the problem owner with different perspectives and ideas on how to solve the problem, how to propose a solution to the problem owner's manager or simply enable the problem owner to share knowledge about the problem with all the participants.

- **General participants -** The problem owner provides the innovation manager or a recognised facilitator with the details of about 80% of the individuals which will

[5] Knowledge management in the context of this project was also investigated on two levels. A knowledge management team is dedicated to knowledge management for MBDA as a whole which involves providing tools for the innovation team, technical excellence, engineering department etc… Knowledge management also takes place within the innovation office or team itself. The innovation office is responsible for this but is also aided by the knowledge management technology which the knowledge management team provides to them and to MBDA as a whole, such as the intranet.

attend the booster. The remainder of the participants may be academics, students or individuals from completely different area of the organisation. The differentiation allows a few people to take part in the booster who may provide a different perspective and non biased recommendation to the problem owner.

- ***During a Innovation Booster -*** There are four main stages of an innovation booster:

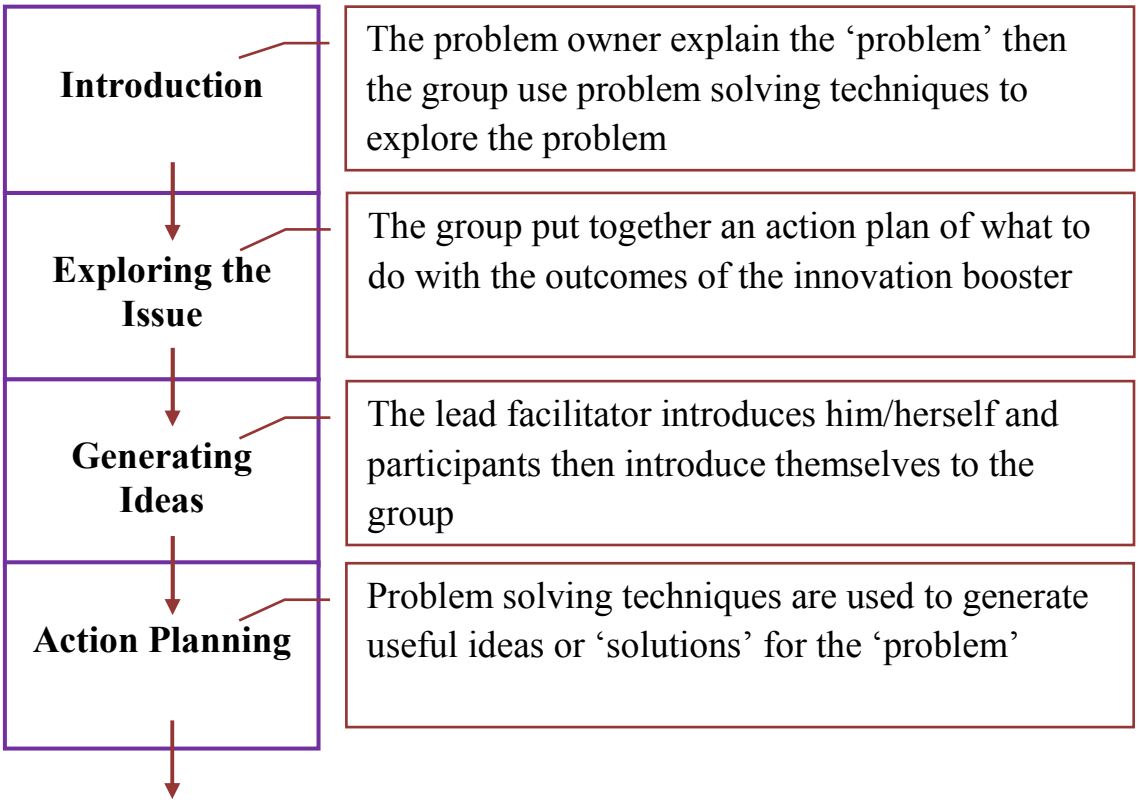

Figure 4.1: During an Innovation Booster

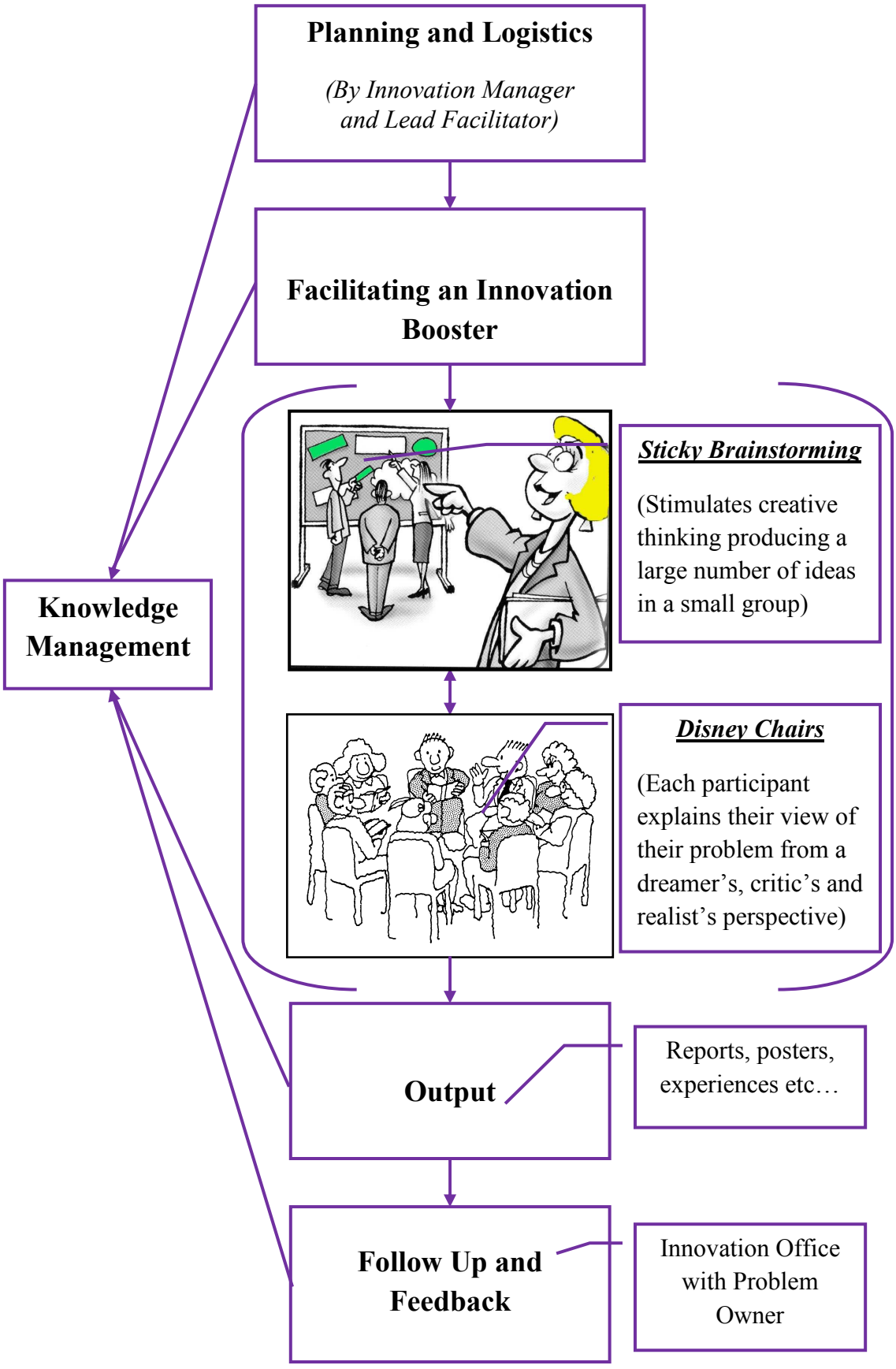

Figure 4.2: Innovation Booster Process

4.2.2 Knowledge Management in the Innovation Team

The innovation office is responsible for knowledge management within the innovation team which involves capturing, recording, disseminating and updating information. Since the main activity of the innovation office is the boosters, the innovation office is of the opinion that knowledge management for these activities is vital in order to continue to deliver a high quality service to its internal 'customers'[6]. As well as using their own knowledge management tools such as a shared drive, they also rely on knowledge management tools from the knowledge management team, such as the intranet. These tools are used to disseminate information and results of boosters, and for general marketing of the innovation office.
Knowledge management tools are essential for the innovation office to enable them to carry out their work effectively throughout the stages of the innovation booster and other related innovation activities.

Knowledge management is important for the innovation office in the following main areas, as shown in figure 4.2

- **Innovation Boosters**

- *Planning and Logistics:* Initially, the facilitator (appointed by the innovation manager) and the innovation manager ask the problem owner to fill in a questionnaire listing details of the 'problem' and what he/she expects and wants from the booster. They then contact employees which the problem owner has requested be in the booster as well as other members such as academic and employees from their business area. In order to do this they use the yellow pages, personal contacts and social networks throughout the organisation.

[6] The innovation office names the participants of the boosters and the problem owner their internal customers. They view all employees across MBDA as their employees because ultimately they are offering them a service which should enable them to be more creative and effective in solving their 'problems' and in their jobs.

- *Facilitating an Innovation Booster:* During the innovation booster, information about what is taking place should be documented so that this can be used as 'lessons learnt.' Participants should be encouraged to interact and share knowledge.

- *Output:* The output of the booster is important because participants have learnt from the experience of the day. The problem owner is asked to fill out a questionnaire detailing what he/she has learnt from the innovation booster and what he/she will then do to follow up the results with his/her line manager. The problem owner then writes a report detailing the actions which he/she will take in terms if the 'problem' taking the results of the innovation booster into account.

- *Follow Up and Feedback:* The innovation manager in the respective country follows up the events of the innovation booster up to six months later with the problem owner. This allows the innovation manager to understand what the benefits of the innovation booster were, how they were used, if at all.

➢ **Innovation Activities**

- *Marketing of the Innovation Office:* The innovation office promotes itself through its innovation boosters, innovation awards and IDEA scheme. The innovation office is also promoted a lot though of word of mouth from participants of the innovation boosters.

- *Social Networking:* The innovation office take part in activities such as external innovation workshops, working with academics, other companies and communicating with all business units of MBDA both nationally and internationally.

- *Innovation Awards:* Build on experience gained from a parent company scheme (BAE Systems). There is an awards ceremony at national and international level which provides an opportunity for recognition for innovative individuals and teams.

- *IDEA Scheme:* Gives employees the opportunity to optimise change by encouraging them to actively participate in collectively expressing ideas. A challenge is put forth by MBDA and employees are encouraged to put ideas forward on how to overcome the relevant challenge.

The main tools which are either currently used by the innovation office or are available but still in development are:

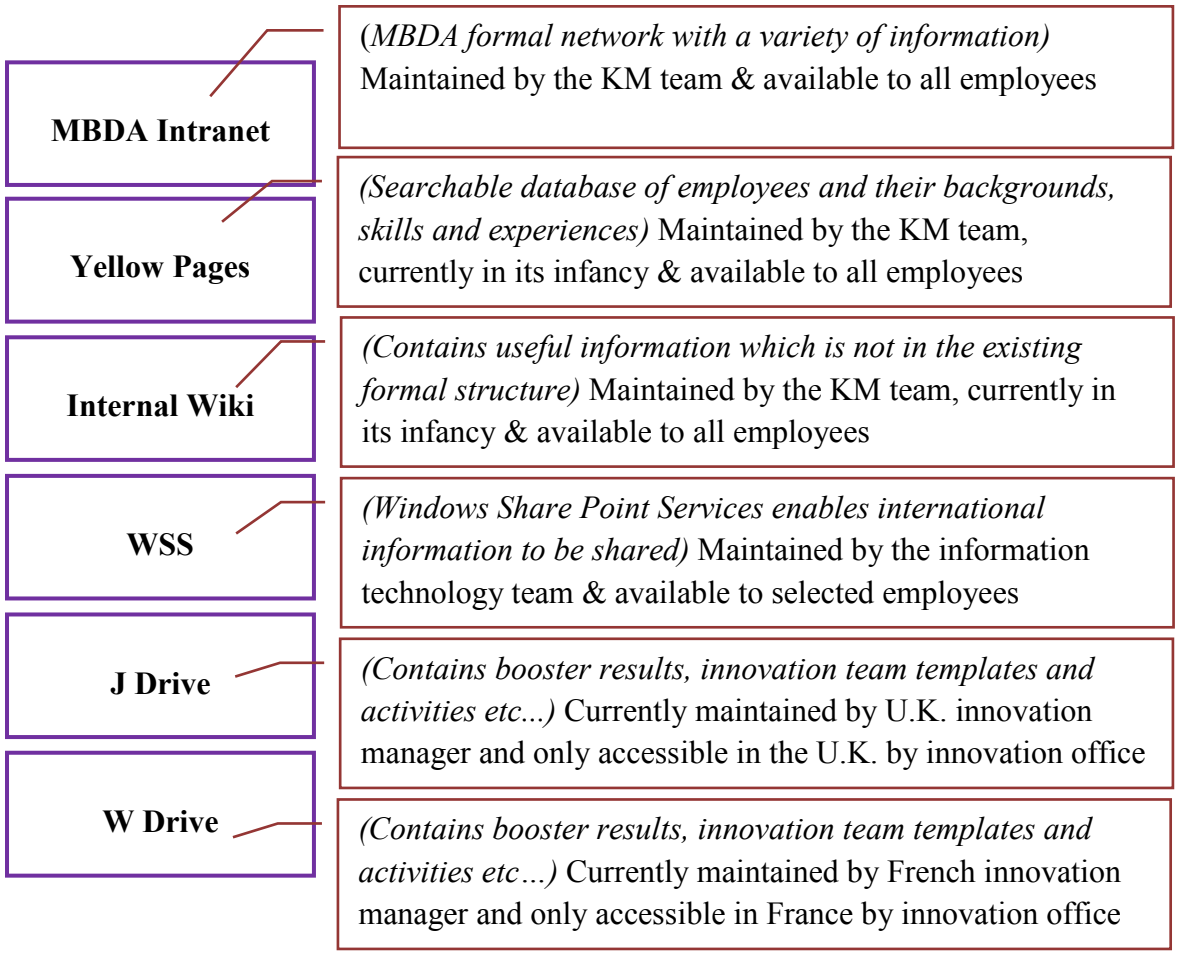

Figure 4.3: Innovation Office Tools

4.3 Data Collection

The research was carried out through; semi-structured interviews and discussions with academics, semi- structured interviews and structured questionnaires with MBDA employees and an industry interviews and questionnaires.

4.4 Data Collection – Academics

These interviews were carried out with five academics in the areas of knowledge management and innovation in order to gain an academic understanding of the subject and advice regarding the project.

The interviews were carried out using semi-structured questionnaires and lasted between 30 and 45 minutes with each academic (participants' backgrounds are detailed in the appendix section under each relevant interview).

The suggested topics which were discussed with the academics were:

- Background of project
- Innovation
- Knowledge management
- Opinions and advice about the project

The results of these interviews were used for the literature review in terms of what journals to search for, what areas to focus on and what areas to investigate further.

4.4.1 Initial Interviewer Observations and Conclusions

The interviews enabled the author to understand the areas of knowledge management and innovation further and from different academic perspectives. The opinions and advice from the academics enabled the author to research different areas of knowledge management and innovation and contributed to developing the company questionnaires.

4.5 Data Collection: Company

The data were collected using semi-structured questionnaires through interviews and structured questionnaires, via email and telephone where interviews were not possible.

The interviews at MBDA took place with members of the innovation office as well as more general employees from across MBDA. Some of the participants had participated in numerous boosters and knew lot about the innovation office whereas others had not. Following the interviews, more specific structured questionnaires relating to the

boosters were administered to a small group of employees, via email and telephone, most of whom had taken part in the initial interviews.

4.5.1 Interviews

These were carried with 14 employees (participants' backgrounds are detailed in the appendix section under each relevant interview), from across the organisation including the innovation office. The interviews were carried out using semi-structured questionnaires and lasted between 45 and 60 minutes with each interviewee.

The participants, in no particular order, included:

1. Innovation Manager U.K.
2. Innovation Manager France
3. Innovation Manager Italy
4. Head of Knowledge Management
5. Principal Engineer
6. Head of Intellectual Property
7. Training Co-ordinator
8. Performance Improvement Manager / Departmental Head for Technical Assistants/ U.K. Ideas Manager
9. Head of Technical Excellence
10. Head of Process, Methods and Tools
11. Graduate Systems Engineer
12. R&D Advisor to Director of Future Systems
13. Head of Knowledge Management, Intellectual Property, Innovation and Technical Institute
14. Technical Advisor

The suggested topics with the company employees were: (with the ones in bold being the initial main areas of focus). The depth of the answer depending on the employee's time constraints as well as their knowledge about each suggested topic; hence the length and the interviews at times varied and focused more on one topic than another.

- Background of project
- Employee background
- **Knowledge management**
- **Innovation**
- **Knowledge management and innovation**
- Boosters
- Additional points (if applicable)

4.5.2 Questionnaires

Following the initial interviews, structured questionnaires were administered to 4 employees, via email and telephone, in order to obtain specific information relating to the boosters. The aim questionnaire was to 'To understand the stages in the boosters; the planning stages, formal outputs and benefits to attendees of the boosters, facilitators and problem owners.'

From the 4 employees, 3 of these employees had been interviewed in the initial interviews. The 4 participants included: (participants' backgrounds are detailed in the appendix section under each relevant interview),

- U.K. Innovation Manager
- 2 Principal Engineers
- 1 Technical Advisor

The questionnaire was structured as follows:

- **Please state if you have been a facilitator/ problem owner or support facilitator**

- **Your personal definition/meaning of:**
- Booster:
- Workshop:

- **Planning stage**
- Is there a process which is followed when putting together the boosters?
- How is it decided that a booster should take place – who decided this?
- How are participants contacted? Where is the information or suitability stored?

➢ **During the Boosters**

- How is information captured?
- Who captures any important information?
- Is this information (assuming important information has been captured) disseminated or used?
- Are there any feedback opportunities set up for any members of the boosters to contact either the problem owner/lead facilitators/support facilitator?
- Are the boosters reviewed for improvement – who does this?

➢ **Follow up Reports**

- How/why are they created?
- Who created them or are they created?
- Where are they kept?
- Who uses them?
- Who can access them / how many times have they been accessed?
- Was the problem owner contacted for feedback and follow up?
- Does the innovation office keep in contact with the problem owner to track changes after the booster?
- Are the reports distributed – who does this?
- Who sets the format of the report – is this set?
- What are the results from the 'problem owner questionnaires'? Are they sent back – is this data actually analysed or looked at?

➢ **Results of Workshops**

- What was the output?
- Did you gain any knowledge?
- Did you learn anything?
- Was it useful – how?
- Has it changed your behaviour as a result?
- Have you applied anything back to your job?
- Has this change/results been followed up/recorded by the innovation team or otherwise?

➢ **Other**

- IAF Foundational Competencies for Certification - do the facilitators meet these competencies at all?
- Due to the fact that there are so many facilitators do they meet to discuss common issues/problems?

Figure 4.4: Booster Questionnaire

4.5.3 Initial Interviewer Observations and Conclusions

The initial discussions with the company as well as the employee interviews and questionnaires revealed that knowledge management within the innovation office was not as effective as it could be due to a number of reasons, the main ones being:

- *Knowledge management tools:* There is no single tool which the innovation team can use efficiently to share information and which is updated continuously. The separate countries have their own drive with all the specific country's information on but this cannot be shared internationally. Even though WSS is internationally accessible it does not contain rich and useful information, is not updated regularly and takes a lot of time to access due to numerous security passwords. The innovation office also does not have a space on the intranet and the yellow pages and internal Wiki are not regularly updated.

- *Innovation Boosters:* The process of planning a booster, documenting the events during and after the booster, sharing the outputs and follow ups are not as effective or efficient as possible

- *Innovation Office Activities:* The innovation office and the services it provides are not well known across the company and this make it more difficult for the innovation team to carry out their activities.

These initial challenges which were revealed from initial talks with MBDA were then investigated further in the interviews with the various employees from across MBDA. The results of the data collection and investigation will be discussed in Chapter 5.

4.6 Workshops

4.6.1 Facilitator Training Workshop

As part of the project, the author observed employees from the company who took part in a facilitator training workshop which ran for three days, the author attended the first two days. The second day took the format of a booster, with a participant acting as a 'problem' owner and creative problem solving techniques used.

4.6.2 Open Innovation Workshop

As part of the project, the author attended a full day workshop at Imperial College London on 'Open Innovation' where participants ranged from a variety of industry sectors.

4.6.3 Initial Interviewer Observations and Conclusions

The facilitator training workshop provided the author with a better understanding of what employees experience and learn during a booster. It appeared that much of the output of the workshop took place during the session in the form of conversations and exchanging ideas and experiences. Other than posters and numerous post-its the author did not see any formal output of the session because the third day was not attended. The workshop at Imperial College London enabled the author to gain a deeper understanding of innovation through its application in industry from a range of academic and industrial speakers at the workshop.

4.7 Data Collection – Industry

The industry interviews were carried out in two different stages; initial interviews via telephone/email were conducted followed by questionnaires via email. The depth of the answer depending on the employee's time constraints as well as their knowledge about each suggested topic; hence the length and the interviews at times varied and focused more on one topic than another.

4.7.1 Interviews

These were carried out with individuals (participants' backgrounds are detailed in the appendix section under each relevant interview) from 7 organisations in order to gain an understanding of knowledge management and innovation in their organisations as well as their personal opinions and insights into these areas. The 7 organisations, in no particular order, included:

- BAE Systems
- Cadbury
- InnovationXchange

- Nissan Technical Centre
- whatifinnovation Consultancy
- PepsiCo International
- Proctor and Gamble

The suggested topics were: (with the ones in bold being the initial main areas of focus).

- Background of project
- Employee background
- **Knowledge management**
- **Innovation**
- **Knowledge management and innovation**
- Additional points

4.7.2 Questionnaires

These were carried out with individuals from seven organisations from a range of different industries. This allowed an insight to be gained into aspects such as how they rate knowledge management and innovation in their organisations and the relationship between these two areas. Six of the seven organisations took part in the initial interview. The organisations, in no particular order, included:

- BAE Systems
- Cadbury
- InnovationXchange
- Nissan Technical Centre
- whatifinnovation Consultancy
- PepsiCo International
- Proctor and Gamble
- PERA- The Innovation Network

Participants who took part in the initial interviews and at the 'Open Innovation' workshop were asked were asked if they would participate in the questionnaires. Seven out of the eleven questionnaires emailed to the participants replied. The questionnaire was structured as follows:

Thank you participating in the questionnaire being conducted for MBDA by Cranfield University as part of an MSc project.
This questionnaire will only take a few minutes for you to complete. If you have any questions about this questionnaire or need assistance, please contact the sender.

- **Background**
  - What organisation are do you work for? _____
  - What is your role/job description? _____

- **Knowledge Management and Innovation**

In the context of your organisation or from your experience what does knowledge management mean?

How would you rate knowledge management in your organisation? (Please ✔)

- ☐ Excellent
- ☐ Good
- ☐ Fair
- ☐ Poor

In the context of your organisation or from your experience what does innovation mean?

How would you rate innovation in your organisation? (Please ✔)

- ☐ Excellent
- ☐ Good
- ☐ Fair
- ☐ Poor

How related are knowledge management and innovation in your organisation and how? (Please ✔)

- ☐ Extremely related
- ☐ Closely related
- ☐ Somewhat related
- ☐ Not related

➢ **Barriers to Innovation**

What are the top 3 barriers to innovation in your organisation? (Please ✔)

- ☐ Excessive bureaucracy
- ☐ Lack of innovation teams
- ☐ Lack of an organisational culture
- ☐ Poor knowledge management
- ☐ Insufficient resources
- ☐ Poor IT infrastructure
- ☐ Not having a formal procedure for submitting ideas
- ☐ Other (Please state)

➢ **Innovation Teams**

Do you have innovation teams in your organisation? If so, how and why are they formed? (e.g. for specific challenges or projects) Please provide an example of this?

- **Further Comments**

  If there are any other comments or thought that you would like to share, please do so here:

End of Questionnaire……..Thank you for participating!

4.7.3 Initial Interviews Observations and Conclusions

The data collected from the individuals who took part in the industry interviews and questionnaires, allowed the author to understand knowledge management and innovation in other organisations. It allowed the author to strike a comparison against knowledge management and innovation with that of MBDA and provide MBDA with examples of how knowledge management and innovation operates in other organisations. The initial industry interviews enabled the author to understand that knowledge management and innovation was defined and practiced differently in different organisations and led the author to carry out the more detailed questionnaires. The questionnaires revealed that like MBDA there are barriers to innovation and that like the literature found teams, including innovation teams, their size nature are different across organisations.

4.8 Summary of the Case Study Phase

This chapter explained the project in the context of the company where it was carried out. It explained the background of the innovation team, knowledge management in the innovation team, their activities and the initial observations of the challenges MBDA were facing. The chapter then proceeded to explain the data collection processes from the academics, company employees, workshops and industry study. The activities described in this chapter enabled the author to understand the innovation office and their core activity, the challenges being faced from the perspective of the company employees as well an understanding of the areas being investigated in the context of industry.

Following the initial observations and conclusions from this chapter, the results were then collated from the various interviews and questionnaires. The author then proceeded to analyse these finding and develop a knowledge management framework for the innovation team's core activity which will be described in Chapters 5 and 6.

CHAPTER 5: ANALYSIS OF RESULTS

5.1 Introduction

The aim of this work is to develop a knowledge management framework for an innovation team. The aim of this chapter is to explain the results of the different research carried out, why the author choose specific findings to analyse, how these were relevant to the aim of the project and ultimately how these findings contributed to the development of the knowledge management framework for the innovation team.

5.2 Data Collection

The data were collected from academics, company employees, workshops and an industry study. The different data were then analysed and the most relevant results relating to the scope of the project were used to develop the knowledge management framework for the innovation team to support and enhance their core activity, the innovation booster.

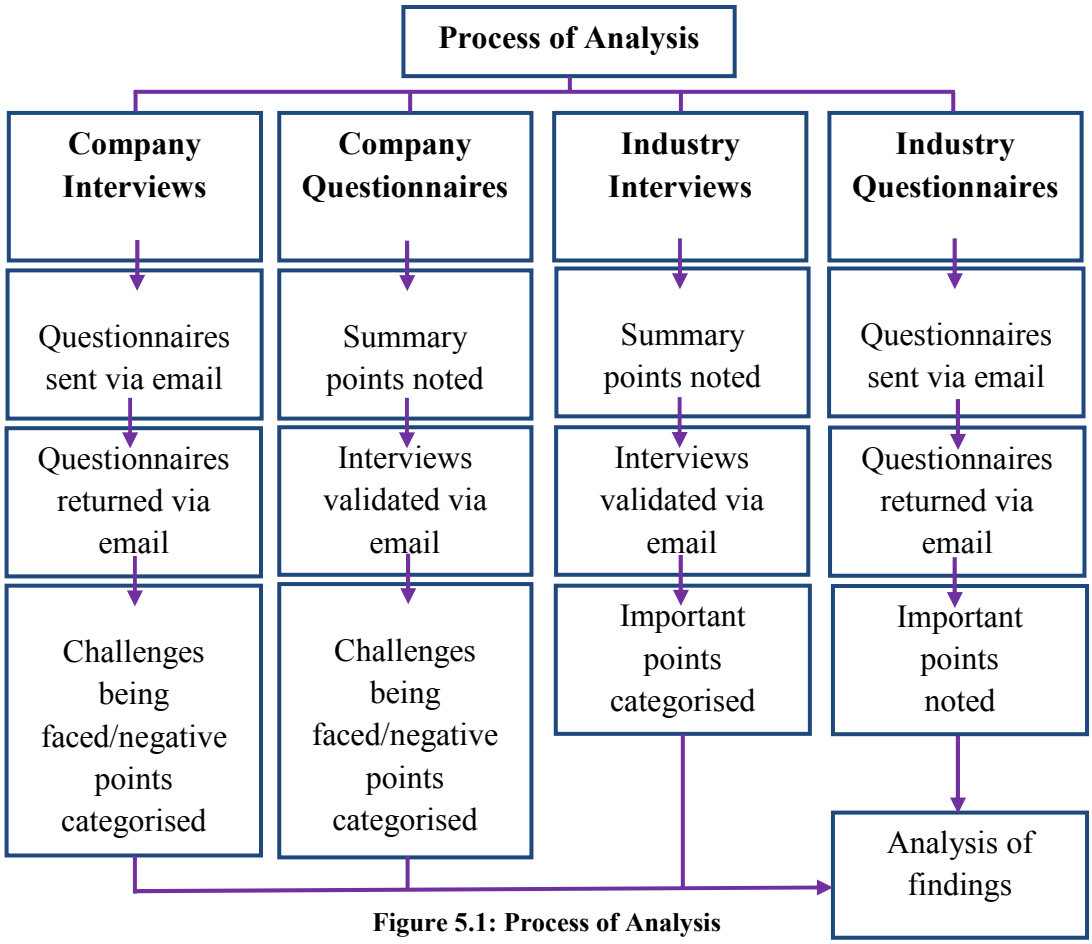

Figure 5.1: Process of Analysis

5.3 Data Collection-Academics

The academic interviews provided the author with two streams of results; practical advice in relation to the challenges MBDA's innovation office were facing and a deeper academic understanding of knowledge management and innovation.

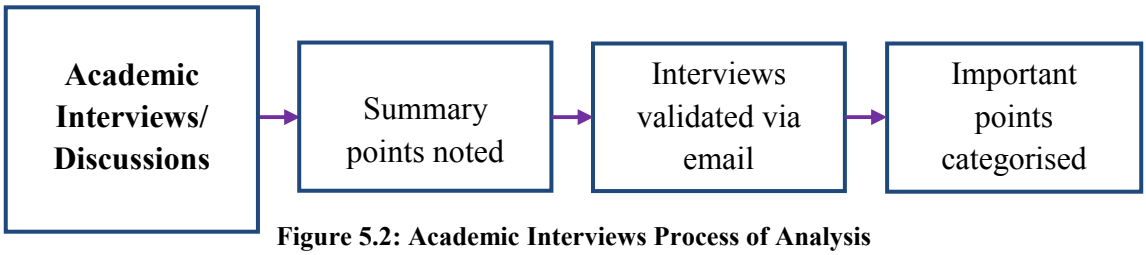

Figure 5.2: Academic Interviews Process of Analysis

The key advice from the academic interviews fell into two main categories, knowledge management and innovation office activities. This contributed to the literature review and the company interviews and questionnaires which in turn contributed to the knowledge management framework for the innovation team (Figure 5.3). The author chose these categories and the points in them because they were the most relevant to the scope of the project and the most helpful in terms of the project deliverable expected.

The academic interviews or discussions provided the author with ideal case scenarios from the view point of the academics. The author then turned these opinions, from the suggested topics which were asked, into questions where several were used in the interviews and questionnaires. For example, one academic's advice was that, 'The organisational culture must allows knowledge to be shared and innovation created', the author then asked the question, 'Does the organisational culture allow knowledge to be shared and innovation encouraged?' The academics also provided the author with direct issues which needed to be addressed, such as, 'Is there a process for the facilitators to record activities?' which was later used in the booster questionnaire.

Additionally, the academic interviews also provided the author with advice relating to the literature review. One academic stated that, '…having an IT team in place to support IT infrastructure will enable knowledge sharing...' This promoted the author to investigate, 'Is a technology infrastructure in place in order for knowledge sharing to be effective?' at MBDA. This also led the author to search for literature which stated that an IT infrastructure must be in place for effective knowledge management (Du Plessis, 2007).

Key Advice from Academic Interviews

➢ **Knowledge Management**

- Are innovation, knowledge and social networks in place?
- Does the organisational culture allow knowledge to be shared and innovation encouraged?
- Are teams and people mobile and does this enable the mobility of knowledge?
- Is a technology infrastructure in place in order for knowledge sharing to be effective?
- Are internal wikis and/or social networking in place to encourage and enable individuals to share knowledge?
- Is there acceptance and encouragement as well as an emphasis of best practices from top management for individuals to share knowledge?
- Is there a sharing & flexible culture in place where management is prepared to lose control to some extent & allow employees to interact socially and be open?
- Are virtual and social events run to encourage knowledge sharing and create an open more creative environment?
- Does a common culture which is in line with how the organisation operates exist between business units in order to allow efficient knowledge sharing and decision making?
- Are there different ways to communicate knowledge; e.g. communities of practice, networks of expertise, knowledge sharing teams, through software such as WebEx meetings and conferences?
- Face to face meetings are essential methods of communication, do these successfully take place?
- Are coaching & buddying schemes in place to retain organisational knowledge?
- It is useful to incorporate individuals' contributions into performance review and/or appraisals. A matrix of the rate of growth of juniors, the quality of the knowledge shared and measuring not only individuals' performance but also their team's performance can be measured to assess knowledge sharing and development success. Is this in place?

➢ **Innovation Office Activities**

- Are processes of boosters recorded to enable more effective use of knowledge?
- Are lessons learnt from experiences, conferences, talks and meetings documented and key contacts shared?
- Are improvements for innovation workshops tracked?
- Does the innovation office conduct innovation fairs and innovation stories?
- What is the process and what series of questions does an innovation manager go through to assess the problem or challenge being faced by a problem owner?
- What is the structure of the booster teams, how and why are they formed?
- Are the achievements after the booster shared and is the knowledge about the processes of innovation documented and shared?
- How is the success of the innovation office and process of innovation critically assessed and measured?
- Is there a process for the facilitators to record activities?

Figure 5.5: Key Advice from Academic Interviews

➢ ***Summary of findings from academic interviews:***

- **Knowledge Management:** Knowledge sharing enablers such meetings and social events, an IT infrastructure, organisational culture and appraisals all contribute to effective knowledge management. The author set out to investigate if these were in place at MBDA.

- **Innovation Office Activities:** Recording of information during the booster, having processes in place by the innovation office for organisation of the boosters, measuring the success of the innovation office and having channels is place for follow ups and for information to be shared, updated and tacked are all critical to the success of the innovation office. The author set out to investigate if these were in place at MBDA.

5.4 Data Collection-Company

5.4.1 Interviews

As discussed, in Chapters 3 and 4, semi-structured interviews were carried out with MBDA employees, including the innovation office. Bullet points of the main points were noted during the interviews and later validated by email with the interviewee. The main trends and key points were then found in the interviews and categorised into seven categories (Figure 5.4). The trends and main points which the author sought to categorise were only comments of where improvements were thought to be needed.

The seven categories included; 'Knowledge Management, Innovation Office, Boosters, IT Infrastructure, Organisational Innovation, Organisational Issues, Organisational Culture. The first four of these categories were chosen by the author to be the most relevant and important in the context of this project.

This was for two reasons:

1. The chosen categories and the points in them where improvements were sought related to the literature review carried out in terms of knowledge management and innovation.

2. The categories chosen were in the scope of the project and allowed the author to make useful recommendations in the time available. However, it must be stressed that the other categories; 'Organisational Innovation, Organisational Issues and Organisational Culture' are also important for the innovation office to consider when assessing factors which may affect the success of the innovation office.

Main Trends and Key Points from MBDA Interviews

➢ **Knowledge Management**

- Knowledge tools required
- Knowledge management poor in projects and across organisation
- Knowledge leaders should be identified
- Knowledge and innovation manager/team leader required in each team
- People should be given time to share knowledge and given incentives or rewards
- Resistance to knowledge sharing should be addressed
- Employees who currently contribute knowledge should be rewarded and identified
- There is no record of lessons learnt
- There is no record of *what* employees know and *who* they know
- Experiences are not transferred or documented
- The application of and access to knowledge should save time in the innovation process but currently does not

➢ **Innovation Office**

- The innovation office needs to be more visible and promoted
- Innovation managers do not know what needs to be innovated
- There is no single formal working process that all the innovation managers share
- The innovation managers are not full time
- People need to be aware that we do not *only* provide boosters
- There is no common international process within the innovation office; it is different in all the countries
- IDEA scheme is not promoted enough, some rewards are given for suggestions rather than actual IDEAS

➢ **Boosters**

- Booster results are not followed up, deployed or documented
- There are too many facilitators / workshops / boosters
- There is no measurement / feedback or record of boosters / workshops
- Problem space for workshops / boosters is not well defined
- The networks formed in boosters should be copied into daily work routines
- Behaviours and skills of people (facilitators) hinder innovation workshops

➢ **IT Infrastructure**

- A more interactive intranet is needed
- The yellow pages need to be updated
- The J drive and innovation database need to be updated
- The IT security causes problems with accessing information
- A policy should be established with three main levels of data – store (W/J drive) / share (WSS) / communicate (intranet)

➢ **Organisational Innovation**

- There is confusion with the word 'innovation' and with innovation initiatives
- Innovation should be benchmarked against other organisations and internally
- Knowledge not utilised in innovation process
- Innovation is promoted mostly/only at senior levels and not encouraged amongst juniors.
- Innovation is not currently benchmarked

➢ **Organisational Issues**

- There is no cross functional/cross project knowledge base
- There should be mentoring programs
- There are too many security measures in place which hinders work
- There is no official organisational structure
- Different and new people need to be encouraged for the awards
- There is no link between knowledge management /innovation/intellectual property
- The hierarchical structure does not encourage knowledge sharing
- IT staff and senior management restrict technological usage and advancement
- There is no feedback from internal customers
- There should be greater involvement of the steering committee & quality network in the innovation office
- There is conflict between functional managers as there is no defined reporting priority

➢ **Organisational Culture**

- There are barriers to share knowledge
- Informal networks are decreasing
- Knowledge sharing culture should be encouraged
- There is no interconnectivity between teams and roles
- Work between juniors and seniors needs to be encouraged
- There are issues with team dynamics
- There are issues with cross project/department links

Figure 5.4: Main Trends and Key Points from MBDA Interviews

➢ ***Summary of findings from MBDA interviews:***

- **Knowledge Management:** Knowledge management tools currently in place is not updated regularly, is only country specific and information is not stored on a platform which can be accessed by all members of the innovation office as well as other relevant members. Knowledge sharing, identification of knowledge leaders and rewards scheme are not in place.

- **Innovation Office:** The innovation office has no formal international processes in place, do not market themselves and what needs to be innovated is unclear.

- **Boosters:** There is a lack of formal processes in place for measuring success of boosters, monitoring facilitators, planning, booster output, follow ups and feedback opportunities.

5.4.2 Questionnaires

Following the employee interviews, the author administered a structured questionnaire, via email and telephone, to further understand the planning, processes and output of the boosters. The results were then categorised into four categories from the different participant's perspectives and the main points were taken from each questionnaire reply. The author chose all the points from the questionnaire which were challenges or problems of the boosters, as viewed by the participants, which the innovation office could improve (Figure 5.5).

All the answers from the questionnaires related to boosters except the definitions of the booster and workshops which were required for clarification. Although workshops do take place, boosters are the main activity of the innovation office.

Key Points from MBDA Booster Questionnaires

➢ **From a problem owner's perspective**

- Definitions of boosters are loosely and differently defined amongst employees
- Recording of information during booster is poor
- Intranet or a soft copy library would be useful to store information
- There is no formal design of reports which the problem owner compiles
- Results of boosters has changed work but has not been followed up by innovation office
- Meeting of facilitators could be better
- No formal process by innovation team for post booster feedback for different participants of booster

➢ **From a facilitator's perspective**

- More opportunities for feedback and lessons learnt should be made
- Follow up reports and results of what outputs were are poor
- Innovation office are poor at tracking progress and results

➢ **From a participant's perspective**

- Information from the booster should be distributed but is rarely done
- No post booster feedback opportunities for members of the boosters
- Reports are mainly created to justify funding
- What happens *in* the actual booster is useful

➢ **From a lead/support facilitator's and participant's perspective**

- There is no consistency with who captures information in each booster
- There is no international network to share information from boosters
- There is resistance between nations to share information and results of boosters

Figure 5.6: Key Points from MBDA Booster Questionnaires

➢ ***Summary of findings from booster questionnaires:***

- **Output of Booster -** The main outputs of a booster is actually during the booster, in the form of conversations, interaction with other participants, understanding of different perspectives, personal learning and experiences gained. The most beneficial output appears to be in an intangible form rather than in the form of reports or tangible changes in a job process or challenge being faced.

- **Knowledge Management -** Capturing and documentation of information during the booster, formal report writing after the booster, dissemination and sharing of the results, feedback and follow up sessions, meetings, all appear to occur but in no formal process , inconsistently and not very effectively.

5.5 Workshops

5.5.1 Facilitator Training Workshop

As part of the project the author observed the first two days of a three day workshop, where the second day was a booster with a problem owner and the use of creative problem solving techniques. Although the three full days were not attended, the workshop allowed personal insight to be gained from the activity as well as the opportunity of meeting participants who then later took part in the interviews and questionnaire.

➢ ***Summary of findings from Facilitator Training Workshop:***

- **Benefit of Workshop:** The author found that the workshop brought employees together who shared a common purpose; i.e. attending the Facilitator Training Workshop. The author felt that this created a bond between participants, (even if this was only temporary) enabled employees to share ideas, perspectives and contribute in creating a result or at least a different perspective for the problem owner's challenge or problem.

- **Output of the Facilitator Training Workshop:** The author did not attend the last day of the workshop, which was how the participants would apply the learning from days one and two back into their jobs. Additionally, this workshop was not a formal booster; it was a facilitator training workshop which would then enable the participants, once completed, to facilitate innovation boosters. The author discussed the outcomes of the workshop with the participants throughout the second day. The output as reflected in the booster questionnaires appeared to be the learning experience and the workshop itself, at that stage the author was unable to determine a

tangible outcome. However, in one of the booster questionnaires which were administered after the facilitator training workshop, one participant highlighted that there no tangible output of the workshop, i.e. a report, and feedback sessions did not take place.

5.5.2 Open Innovation Workshop

As part of the project the author also attended an 'Open Innovation' Workshop at Imperial College London where members from a range of industries attended.

➢ ***Summary of outcomes from Innovation Workshop:***

- **Contacts Made:** The workshop enabled the author to make contacts of members whose jobs involved knowledge management and innovation. These contacts were then later approached to take part in the industry study questionnaires.
- **Personal Insights:** The author also gained different perspectives and insights into know ledge management and innovation in different sectors ranging from healthcare to the consumer goods industry.

5.6 Data Collection – Industry

The industry study was carried out in two stages; interviews via telephone and email followed by questionnaires via email.

5.6.1 Industry Interviews

The key points from the interviews were categorised in terms of the suggested topics which were asked for the interviews and also by how relevant the categories were to the project scope, literature review and categories in the employee interviews.

Key Points from Industry Interviews

➢ **Innovation**

- Innovation is critical to the success of all types of organisations
- Successful innovation should be celebrated and made public across an organisation
- The biggest barrier to innovation is individuals' ways of thinking in terms of their corporate position and technical thinking

➢ **Knowledge Management**

- Rewarding individuals becomes irrelevant if the infrastructure and the training are in place
- Barriers exist between functions and managing timelines geographically can be challenging
- Face to face and video conferencing is the most efficient form of communication
- People should definitely be rewarded in different ways and in the way which meets their individual needs which may not always be monetary
- Established Communities of Practice connect people with common interests that work in different business areas
- To enable knowledge sharing monthly reports that are made available throughout the organisation are written as well as IT systems that allow questions
- Knowledge is shared openly only if there is no sense of personal risk and there is some sense of reward This is a question of culture/climate

➢ **Knowledge Management and Innovation**

- Innovation is intimately linked to knowledge management from two perspectives; (i) technical innovations in terms of IT, data storage, visualisation techniques, intelligent agents and similar algorithms and (ii) the structure of the knowledge – appropriateness and timeliness
- The relationship between knowledge management and innovation is about people, the greater the depth of common knowledge the more this will lead to innovation

➢ **Workshops**

- Workshops take place from an R&D perspective for anticipated challenges of products with the customers and consumers in mind
- Workshops promote creative thinking and can also be technical workshops
- Workshops break and have broken down barriers between people and groups

Figure 5.6: Key Points from Industry Interviews

➢ ***Summary of findings from industry interviews:***

- **Innovation:** The organisations stressed that innovation was critical to them but barriers such as bureaucracy and individuals' thinking can hinder innovation
- **Knowledge Management:** The organisations explained that knowledge sharing is vital to organisations through IT infrastructure, social networking and meetings. They emphasised that rewards for sharing knowledge should be in place as well as a knowledge sharing culture.
- **Knowledge Management and Innovation:** The organisations highlighted that there is a definite link between knowledge management and innovation and that organisations should ensure knowledge management supports and enables innovative practices and people.
- **Workshops:** Although the word booster was not mentioned, the organisations explained that workshops were used to promote innovative and technical thinking, or put together for certain work projects and/or to break down group or department barriers and silos.

5.6.2 Industry Questionnaires

Following the industry interviews, questionnaires were emailed to members from the participating organisations. From these 7 out of the 11 participants replied.

Figure 5.7 represents the questionnaire results from the seven replies.

Key Points from Industry Questionnaires

- How would you rate knowledge management in your organisation?

Knowledge Management	Number of Replies
Excellent	1
Good	4
Fair	0
Poor	2

- How would you rate innovation in your organisation?

Innovation	Number of Replies
Excellent	2
Good	3
Fair	2
Poor	0

- How related are knowledge management and innovation in your organisation?

Knowledge management relationship with Innovation	Number of Replies
Extremely related	4
Closely related	1
Somewhat related	1
Not related	1

- What are the top 3 barriers to innovation in your organisation?

Barriers to Innovation	Number of Replies
Excessive bureaucracy	3
Lack of innovation teams	0
Lack of organisational culture	2
Poor knowledge management	1
Insufficient resources	2
Poor IT infrastructure	2
Not having a formal procedure for submitting ideas	3
Other (listed below)	5

- Do you have innovation teams in your organisation?

Innovation Team	Number of Replies
Yes	6
Not answered	1
Other form of teams	1 (working groups)

Figure 5.7: Industry Questionnaires Results

➢ ***Summary of findings from industry questionnaires:***

- **Knowledge Management:** Knowledge management was defined differently by all the organisations. Knowledge sharing was enabled by people, an IT infrastructure and knowledge sharing culture. Four out of the seven respondents rated their knowledge management as 'Good' in their organisations.

- **Innovation:** The responses included innovation being the exploitation of new idea, change, organisational culture and new methods of processes and work. Three out of the seven organisations rated their innovation as 'Good'.

- **Knowledge Management and Innovation:** Four out of the seven organisations highlighted that their knowledge management and innovation are, 'Extremely related'. One respondent highlighted that their knowledge management and innovation are not related in their organisation stating, 'We show very little attempt to innovate and have no clear knowledge management structures.'

- **Barriers to Innovation:** The barriers to innovation varied across the different organisations. They included excessive bureaucracy, poor IT infrastructure, insufficient resources, not having a formal procedure for submitting ideas as well as the following other comments:

× 'Lots of ideas and active projects, but insufficient A&M (advertising and marketing) to support, or lack of space in the innovation calendar either for us or the trade. i.e., there are a finite number of launches that can be executed well each year. We would be more efficient in our execution of innovation if we had stronger global links and (IT) systems, which is what we are building now.'

× 'Poor predictive research methods AND lack of support for "serial individual innovators"'

× 'Leadership is not used or infiltrated down into the organisation'

× 'The vision of the individual – ability to spend time thinking outside the box'

× 'Short term focus'

- **Innovation Teams:** Six out of the seven organisations have innovation teams in their organisations, with one having 'working groups' which are formed on a 'need to have basis' and are 'the main vehicle for sharing knowledge.' However, the results indicated that innovation teams were different in all the organisations with some being R&D related to others dedicating an entire 'Advanced Technical Centre' to an innovation team. This is an important point because it reflects that the innovation office or team at MBDA is unique in its activities and nature as are all the innovation teams in the organisations which took part in the questionnaires.

- **Other Important Comments:**

- 'Working Groups (WG) tend to be the main vehicle for sharing (technical) knowledge using the company-based IT infrastructure (Intranet). These WGs are formed on a "need to have" basis and tend to have definite lifetimes of existence.'
- 'Other means of knowledge exchange/sharing within the organisation tend to be ad hoc or piecemeal; within departments, groups, business units etc. The mechanisms can vary from official (or not) reports (electronic and/or hard copy) or e-mail.'
- 'The company's intranet / website is a major source of information, particularly that relating to processes, guidelines, best practice as well as general news updates. This platform for knowledge sharing is particularly useful for common practices, style-guides, pro-forma, top-level statistics and publicity as well as for company rules and regulations.'
- 'There is no shortage of ideas either inside or outside most organisations – the problem is the ability of the internal organisation to accept and use these ideas.'

5.7 Summary of Findings

The interviews and questionnaires with the academics, company employees and members from industry produced a range of different findings; however within them lay a common theme. Following the analysis of the findings, the author felt that the prominent findings and those which related to the scope of the project, the literature review and the deliverable expected included:

➢ **Knowledge management**

- Knowledge management tools are vital for knowledge sharing
- Tacit knowledge activities include meetings, social events and networking
- Knowledge management is an enabler for innovation

➢ **Innovation**

- Innovation teams, offices, departments and their activities are organisation specific
- There are different types of innovative outputs including processes and products
- It is important to monitor and measure the success of innovation activities

5.8 Summary

This chapter has explained the research carried out, what was asked, who took part and the main results obtained from the research. The findings from this chapter allowed the author to determine the key improvements which were required for the innovation team's core activity, their innovation boosters and to develop the knowledge management framework discussed in Chapter 6.

CHAPTER 6: FRAMEWORK DEVELOPMENT AND VALIDATION

6.1 Introduction

The aim of this work is to develop a knowledge management framework for an innovation team. The previous chapters in this work explained the academic literature in the context of this work, how the research was intended to be carried out and how it was then carried out, a case study of the innovation team at MBDA followed by an analysis of the findings. This chapter aims to use the results from the research carried out to develop a knowledge management framework for an innovation team to support and enhance their core activity, the innovation booster.

6.2 Innovation Office Activities

As discussed in Chapter 4 the main activities of the innovation office are the innovation boosters. The innovation boosters use creative problem solving techniques to enable participants to then use what they have learnt in the boosters in the challenges they face in their jobs. The boosters encourage participants to interact and share ideas giving the problem owner different perspectives and opinions on how the 'problem' he/she has brought to the booster can be addressed. However, as discussed in Chapter 5, the analysis of the results revealed that the innovation boosters; their planning, output and follow ups are not as productive and effective as they could be. The findings also revealed that the innovation office needs to address their other activities such as their IDEA scheme, advertising and marketing and improving their knowledge management tools to meet their activities (Figure 6.1).

Figure 6.1 illustrates the main areas where the innovation office needs to improve based on the findings in Chapter 4 and 5. Although these three main areas and their success are critical to the innovation office, this chapter and the knowledge management framework will focus on the innovation boosters and what aspects of them the innovation office should seek to improve. The innovation boosters are the main activity of the innovation office and it is the success of the boosters which justify their existence

as a team within MBDA. By improving the management of the boosters, their outputs and success the innovation office will continue to grow in reputation and as a service based team within MBDA.

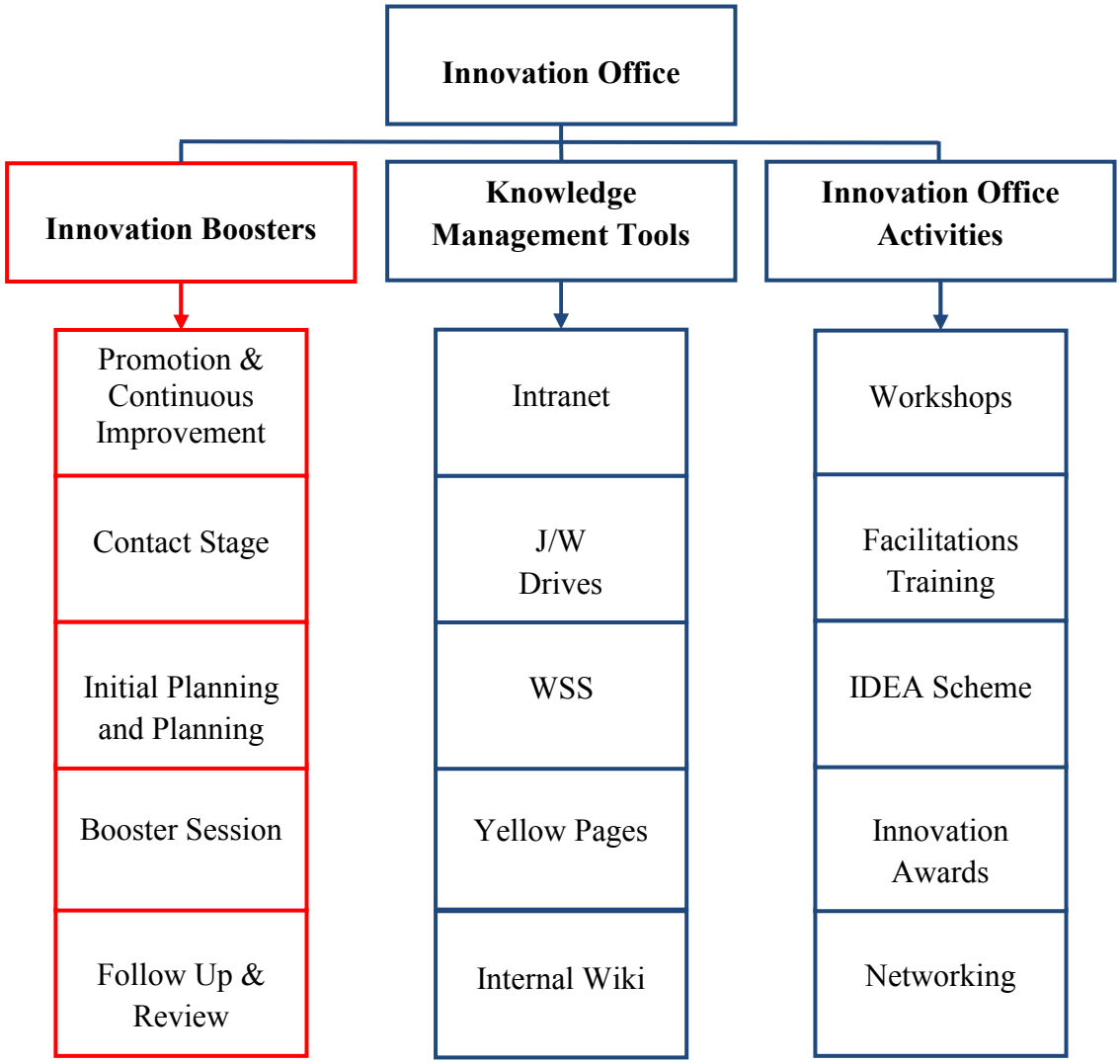

Figure 6.1: Innovation Office Activities

6.3 Knowledge Management Framework for Innovation Booster

As discussed, the focus of the framework will be on knowledge management of the innovation boosters. Based on the research carried out the author has divided the innovation booster into five main stages where knowledge management improvements are required. Figure 6.2, the knowledge management framework, is based on the research carried out for this project, and illustrates the process of an innovation booster

consisting of the initial promotion and continuous improvement , contact stage, planning stage, booster stage and ending with the outputs/follow-up and review stage. The red lines bordering the shapes indicate where changes or improvements are required in the current process while the feedback loops stress the need continuous knowledge exchange and updated documents, feedback and knowledge sharing tools. This process of continuous knowledge exchange with continuous 'feedback loops' helps to identify knowledge which is 'fit' for the purpose of the organisation in order for innovation to then flourish (Harkema and Browaeys, 2002). The knowledge management framework will allow the innovation team to implement changes or make improvements at all stages of the innovation booster which will enable more effective communication, planning, knowledge sharing and organisational learning.

6.3.1 Explanation of the Framework Development

(The use of the word added indicates a procedure or course of action has been added to the process while the word highlighted indicates a change to a process already in place)

- **Promotion and Continuous Improvement Stage:**

Currently: The innovation office does not use WSS, which allows knowledge sharing and collaboration on an international level, to share knowledge and information. Additionally, the intranet is not used for advertisement or promotion of the innovation office and their services.

Relevant research found: The *academic literature* found that knowledge management tools enable knowledge sharing (Du Plessis, 2007) and ensure that an organisation's performance is continuously improving through effective and available knowledge sharing procedures and culture, identifying 'knowledge workers' and leaders (Drucker, 1999). The *company investigation* found that the intranet was not utilised or updated and that the different innovation managers used separate country specific network drives rather than WSS where information could be shared internationally. The *industry study* found that knowledge management though effective tools were vital for knowledge sharing and communication across the organisation. In one organisation a

key to knowledge management was; 'an intelligent IT engine able to process and tailor the data into useful knowledge.'

Ideally: The 'Communication: Promoting Visibility' and 'Supporting Knowledge Sharing' shapes have been highlighted and linked to the added updated and maintained 'Intranet' shape to; support the communication and visibility (contact details of innovation office/services provided) of the innovation team across the organisation and to advertise successful results from the innovation boosters from phase 5.
The updated and maintained 'WSS' shape has also been added here to; support knowledge sharing between innovation managers on an international scale rather than using the country specific network drives. It will also enable the facilitation team to access updated information and provide the innovation office with useful results of their periodic meeting from phase 5.
Continuous improvement should be supported by knowledge sharing through the use of WSS, a tool that supports international information sharing file sharing and included a multilingual language pack, for the innovation office and the intranet on a wider organisational office for promotion and advertising of the innovation office success and contact details. The separate country specific drives can be used but only to store country specific or 'back office' documents such as the venue document, booster templates (may be in different languages depending on country) or schedules. However, lists of interested participants or facilitators should be shared on WSS because this could enable or encourage cross-country attendance and interest, which would add to the richness of an innovation booster.

- **Contact Stage:**

Currently: The problem owner contacts the innovation office with a problem or a facilitator offers help to address a specific issue that is evident to them. However, the innovation office and facilitators are not especially visible across MBDA making contact more difficult and unsystematic.

Relevant research found: The *academic literature* found that knowledge management, tools, processes and platforms facilitate, 'reflection and dialogue to allow personal and organizational learning and innovation' (Du Plessis, 2007). The *company investigation*

found that not everyone is aware of who the innovation is and how to contact them with a problem. The services the innovation office provides were also not well defined across the organisation or advertised effectively. The *industry study* found that although knowledge exchange/sharing within an organisation can be ad hoc or piecemeal knowledge sharing mechanisms can vary from 'official (or not) reports (electronic and/or hard copy) or e-mail.' The study also found that a '…company's intranet / website is a major source of information…'

Ideally: The 'Problem Owner Contacts Innovation Office' shape has been highlighted to emphasis that the use of the added intranet in phase 1 to promoting the visibility of the innovation office will enable the channels of communication for a problem owner and the innovation office to be clearer and more effective.

The problem owner or anyone across MBDA should be aware of who the innovation office is and be able to contact them easily through the intranet, telephone or otherwise.

- **Planning Stage*:***

Currently: Suitability for a booster is assessed on the problem and other factors, if the problem is suitable for a booster the problem owner is provided with a booster pack containing forms to be completed about the problem. The team is then assembled, 80% of whom the problem owner requests to be invited while the other 20% are based on the facilitator's contacts based on previous participants and interested parties.

Relevant research found: The *academic literature* again reflected the use of knowledge management tools to share knowledge and communication (Du Plessis, 2007) while email was also highlighted as an effective tool (Bröchner *et al,*. 2004). The *company investigation* found that at times the same participants are invited to the booster session because they show interest rather than the innovation office attempting to find new people who may be interested or suitable for the booster. The services the innovation office provides were also not well defined across the organisation or advertised effectively. The interviews also found that the internal Wiki and Yellow Pages are not updated and if they were they would be useful to the innovation office in deciding who to send on a booster. The *industry study* found that in organisation expressed that they, 'would be more efficient in our execution of innovation if we had

stronger global links and (IT) systems, which is what we are building now.' This highlights that other organisation too have IT issues however ideally IT should be an enabler rather than a constraint to planning and contact.

Ideally: The updated and maintained 'Internal Wiki' has been added here to assist the facilitator and/or innovation manager to access information about the problem, being faced by the problem owner. This will allow a better understanding of the problem and contribute towards assessing its suitability for the innovation booster.

The 'Booster Information Pack' has been highlighted because currently the documents provided are not effectively planned or laid out. These should be merged into one useful document which provides the problem owner with concise sections such as; problem explanation, follow up arrangements (including report writing and planned post booster review date), techniques used during the booster and comments about them, what was expected and what was gained and any additional comments such as how enjoyable the booster was or the selection of participants.

The 'Assemble the Team 'shape has been highlighted and linked the added 'Yellow Pages' shape illustrating that the facilitator should utilise the updated yellow pages to contact participants while the highlighted 'All Participants' document should be constantly updated and stored on WSS (international knowledge sharing platform) for all the innovation team to have access to.

The booster pack should include the feedback form as well as arranging to when the follow up session will be with the problem owner and innovation office after the booster session. While assessing the suitability of a problem for a booster the facilitator and/or innovation manager should have access to the updated Internal Wiki to gain information about the problem and past experiences. This may indicate that a booster is not required but that the problem owner can contact another employee within the organisation for advice and direction. While assembling the team, the facilitator should not only have access to previous participants and interested parties. They should seek to find new people who may be interested or invite communities of practice with common interests but which may also be from completely different background to the problem owner via the corporate Yellow Pages or through social events. The innovation office and key facilitators should keep in contact with them via the intranet and email. The updated

internal Wiki should be accessed to invite other participants even if their backgrounds are not suited to the problem to add different perspectives and insights to the booster.

- **Booster Session Stage:**

The author made a comparison between a meeting and parts of the innovation booster.

Currently: The focus is currently on the results of the session and that the problem owner will find a solution or at least a possible solution/s the problem he/she bring to the session.

Relevant research found: The *academic literature* that a company's competitiveness is improved through continuous learning involving knowledge creation and transfer Li and Gao (2003). Haldin-Herrgard (2000) highlights that methods such as, 'direct interaction, networking and action learning that include face-to-face social interaction and practical experiences' are key to sharing tacit likewise are team work and 'active contribution of the learner' to learning knowledge. Bröchner *et al.,* (2004) also found that face-to-face meetings were perceived as the best knowledge transfer mechanism. The *company investigation* found that the benefits of the booster are actually during the booster itself in the form of experiences, knowledge sharing and interaction rather than the physical explicit results. The *industry study* found that although boosters do not take place as such, workshops do. These are for different reasons ranging from being for a specific project to one off meeting s about a product launch etc… However, the key to all the workshops was to 'promote creative thinking' and 'break down barriers between people and groups.'

Ideally*:* The 'Advertise Booster' shape has been added to indicate that the booster should be advertised as not only a session which may provide results to a problem but also as a knowledge transfer or sharing activity which will promote idea and experience exchanges between participants from varying backgrounds. This will promote the visibility of the innovation office through advertisement on the intranet which should be constantly updated. The booster itself brings together different participants from different backgrounds and this in itself allows a rich exchange of experiences and ideas and is a knowledge sharing and transfer activity. This selling point should be advertised

and used to market the booster. Additionally, since these are key outcomes of the booster, the company should seek to periodically measure them.

- **Outputs / Follow-Up and Review Stage:**

As well making a comparison between a meeting and parts of the innovation booster, the author also made the comparison between a meeting and the follow-up and review stages of an innovation booster.

Currently*:* All participants are immediately given feedback forms which do not always get returned to the innovation office. The feedback session with the problem owner which is planned after the booster does not always take place. The problem owner does not always create a report and if he/she does this is not always shared. The facilitator team does not periodically meet to reflect on their experiences and learning making it more difficult to assess the skills and success of facilitators.

Relevant research found: The *academic literature* found that a six month period was ideal for a post-project review Koners and Goffin (2007) (post booster follow-up and review). Von Zedtwitz's (2002) found that Agilent[7] emphasised the importance of inviting cross-functional participants to post-project reviews to, 'enhance the array of issues raised'. The *company interviews* found that some facilitators do not have the skills or experience to run an innovation booster and reports are not always created or shared. Some employees indicated that they would like to attend a feedback session but are given questionnaires rather than engaging in discussion after the booster or after a certain period of time following the booster. A follow up session with the problem owner did not always occur and reports were not always written or shared. The *industry study* found that it is important to have a great depth common knowledge between people which will lead to innovation and to enable them to share this knowledge.

Ideally*:* The 'Immediate Discussion with all Participants about Booster' shape has been added to indicate that round table immediate informal discussion should take place and feedback forms should only be offered and not given to all participants as currently done, avoiding unnecessary wasted time and costs. The 'Problem Owner Creates

[7] Agilent or Agilent Technologies is a U.S based measurement and instrument company.

Report' shape has been highlighted here to emphasise that it is important for the innovation office to track the progress of the report and ensure that it is shared in an appropriate format to all participants and any other relevant individuals.

The 'Feedback from all Participants: Periodic Discussions or Random Sampling Questionnaires' and '6 months' shapes have been added here to indicate that all participants should be contacted, either via email questionnaires or face-to-face group post booster review, after a 6 month period rather than just the problem owner as currently, however not always, done. At the post booster review the innovation manager should be concerned with how the booster changed the work of the participants either in an intangible or tangible way. The innovation manager should ask questions such as, 'Did the booster change the way in which you do your job?', 'Did the booster bring about any changes from management after you put a proposal forward?', 'Do you apply any of the creative problem solving techniques to your job?' and 'Has your behaviour or outlook changed as a result of the booster?.' The innovation manager should also ask the problem owner if he/she would like to present his/her results to the participants of the boosters or to any other groups of people across the organisation. If any other participants feel that they have used some aspect of the booster to improve the way in how they work or think, also suggest that these can be shared.

The 'Periodic Facilitation Team Meetings' shape has been added here, to indicate that the innovation office should organise the facilitation team to meet periodically in order to reflect on their skills, learning and experiences of facilitation. The meetings will enable the facilitators to learn from one another and discuss key issues of facilitation as well as share and update this information on WSS.

The 'Successful Booster Results' shape has been added here, to indicate that successful booster results and contact details of the participants involved, should be shared on the intranet for employees across the organisation to access and view. This will also promote the visibility of the innovation office as well as knowledge sharing between present and past problem owners.

In order to receive immediate feedback about the booster, the facilitator should conduct a round table discussion immediately after the booster and offer feedback forms to anyone who wants to add more comments or feedback. All participations as well as the problem owner should meet six months after the booster to collectively discuss what

they have leant from the booster and how this has affected their work as this is a key output of the booster. On the other hand, if there are time and resource constraints, a questionnaire may be sent to all the participants of the boosters.

6.4 Validation

In order to assess the feasibility of the results of this work, a validation process was carried out. Time and logistical constraints made it impractical to meet with all members of the innovation office for the validation process. Due to this, the validation process was organised with the industrial supervisor, the head of innovation, who was the most appropriate person. It was pointed out by the head of innovation that there would be practical and logistical limitations of having meetings in which, "All participants as well as the problem owner should meet six months after the booster", and the alternative of a questionnaire was agreed as being cheaper and more practical. The framework and the proposed changes or improvement were accepted and seen as beneficial to the innovation office, although the author advised further assessment of each recommendation to be taken before consideration or implementation.

6.5 Summary

This chapter explained how the knowledge management framework for the innovation team was developed, what parts of innovation booster process needed changing or improving and the validation of the framework with MBDA's head of innovation. It is anticipated that the framework will assist an innovation team to appreciate that all the stages of a meeting are vital specifically the outputs in *both* an explicit and tacit form.

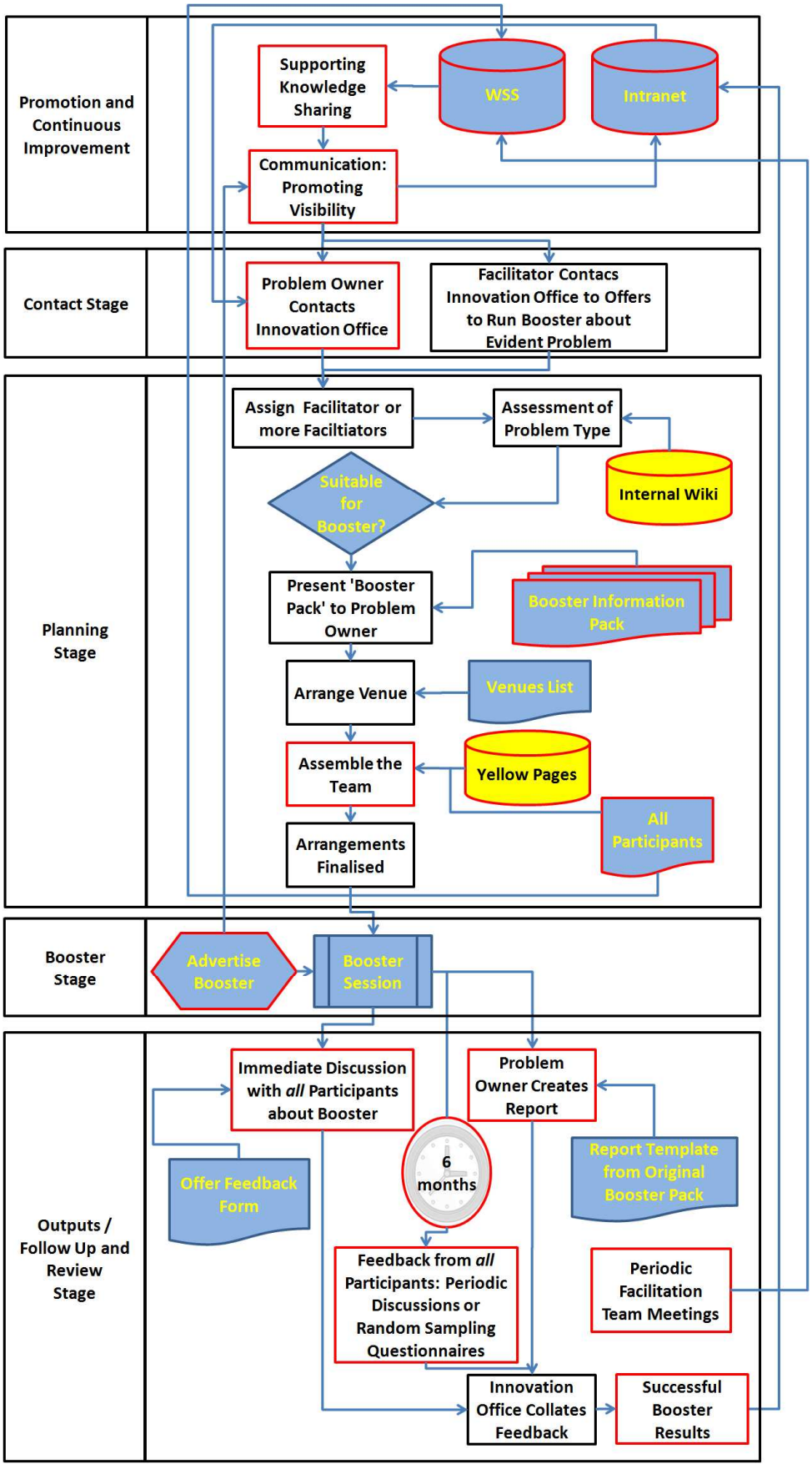

Figure 6.2: Knowledge Management Framework for an Innovation Team

CHAPTER 7: DISCUSSION AND CONCLUSIONS

This chapter aims to discuss the main benefits of this work, the research limitations, and the recommendations for future work.

7.1 Main Benefits

This work developed a knowledge management framework for an innovation team which described how the important stages of a meeting (innovation booster) should be planned, monitored and measured. The results obtained and represented in the form of the framework indicate where improvements or changes and could be implemented. The framework provides a general overview of the five stages of the innovation booster and it is anticipated that they will enable the innovation office to deliver a more successful and well managed innovation booster. The knowledge management framework was made up of, a promotion and continuous improvement, contact, planning, booster session or meeting and outputs and follow-ups and reviews stage, making it applicable to any organisation or research which involves a group of individuals who come together for a common purpose, i.e. a meeting.

7.2 Research Limitations

The results of this research relied largely on interviews and academic literature and less on the author actually personally attending any boosters. This lack of experience may reduce the validity of the proposals. However, the comparison made between, a post-project review and an innovation booster and a post- project review and the innovation booster follow-ups and reviews, by the author contributed in a large way to the results and recommendations of this work because both were viewed as gatherings and meetings of people. Additionally, because of the innovation team, their activities and innovation teams in general being organisation specific as well as time constraints it was difficult to locate and directly compare their activities to innovation teams in other organisations.

7.3 Recommendations for Future Work

This work developed a knowledge management framework compromising of proposed changes and improvements for an innovation team's core activity. Future research, identifying other innovation teams and their specific activities in other organisations and carrying out a comparative study would be useful. Due to the deliverable expected, qualitative research was carried out to explore different opinions and experiences of participants. However, quantitative research would be helpful in identifying how tacit experiences from meetings are measured and how this contributes to individual and organisational learning. This could be carried using questionnaires with a measurement scale in place or with questions about not only the amount of experience gained from a meeting but more specifically how the tacit experience gained was then applied back into an individual's job or work routine. Individuals could also take part in exercises which test their tacit knowledge and experiences from a specific meeting by asking questions which directly relate to the content of that meeting.

Studies have been carried out to evaluate business tacit knowledge in different business situations relating to how to assess the level of tacit knowledge related to managing self, tasks and other people using nine different work-related situations or scenarios (Wagner and Sternberg, 1991). Additionally, Wagner (1985, 1987) developed a questionnaire consisting of twelve business situations and ten strategies to help organisations to evaluate business tacit knowledge of management selection, training, and promotion programs. Nevertheless, it is vital to recognise that due to the very nature of tacit knowledge, individuals may not even be aware what specific tacit knowledge or experiences they have gained from a meeting and consequently use in their work. It is difficult to separate what exact knowledge has been gained from a particular event because this may very well have been amalgamated with the individual's prior tacit knowledge or experience, to form a new combination of individual tacit knowledge and ultimately organisational knowledge.

7.4 Conclusion

This work has developed a knowledge management framework for an innovation team providing an understanding of the importance of; knowledge sharing tools to enable

communication and updated information, the meeting as a knowledge sharing activity and measuring and monitoring the outputs of a meeting both tacit and explicit. This was achieved by carrying out an in-depth literature review investigating areas such as knowledge management, innovation, innovation teams and post-project reviews. The research also involved interviewing members of both the innovation team and employees from across the organisations to understand their and opinions and experiences. An industry study, identifying areas such as knowledge management, innovation, barriers to innovation and innovation teams was also carried out. The analysis of the results led the author to identify key areas where changes or improvements could be made in the knowledge management of the innovation team's activity consequently developing a knowledge management framework for the innovation team. The research concludes by providing recommendations for future work, such as a quantitative study, aimed at knowledge management for an innovation team.

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APPENDIX

This section contains the:

- Academic interviews
- Company Study: Interviews and Questionnaires
- Industry Study: Interviews and Questionnaires

The interviews are structured in no particular order or sequence, all the depth of results vary in length due to time constraints, knowledge and backgrounds of employees.

Please note: The interview/discussion with the academic- Head of the Decision Engineering Centre was not validated by email as well as the industry interview and questionnaire by Nissan's Manager of Business Efficiency and Organisational Change due to time constraints.

Academic Interviews

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 12th June 2008
Location: Cranfield University, Building 40
Interviewee: Senior Lecturer Sustainable Systems

Key Comments:

- **Explain background of project**

- **Opinions and advice about project**

Innovation
Understand people's backgrounds: skills and work styles (explicit) personality types (tacit)
What needs achieving: to solve a technical problem and make improvement or to produce a new product or process for market
Understand requirements of team and working styles

Knowledge management and innovation
Management should identify key people and document skills and abilities to avoid diminishing capacity
Create circumstances to ensure that knowledge is exploited and innovation promoted
Problem solving is the nature of MBDA's core business and this is incremental so knowledge must be shared and innovation promoted
Culture must allows knowledge to be shared and innovation created

Other
Understand people's backgrounds who are being interviewed
What is the structure of the teams, how and why are they formed
Do the mechanisms of sharing ensure that ideas are drawn within the team
Are the achievements after the programme shared and is the knowledge about the processes of innovation documented and shared
How is the success of the innovation team, process of innovation critically assessed and measured
Are teams and people mobile and does this enable the mobility of knowledge
Is there a process for the facilitators to record activities

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 13th June 2008
Location: Cranfield University
Interviewee: Senior Lecturer in Strategic Innovation Management

Key Comments:

- **Explain background of project**

- **Opinions and advice about project**

Innovation
Process innovation managers go through
Are processes recorded to enable more effective use of knowledge?
Lessons learnt from experiences, conferences, talks and meetings should be documents and key contacts shared

Knowledge management and innovation
Innovation networks promote knowledge sharing
Social networks across an organisation promote knowledge sharing and innovation
Different sources of knowledge form knowledge networks – they contain repositories of data and knowledge

Other
Job descriptions of innovation managers and head of innovation
How are improvements for innovation workshops tracked
What are the kinds of problems being faced by innovation managers
Innovation fairs to promote innovation across the company
Do innovation networks exist across the organisation to enable connections
What process and what series of questions does an innovation manager go through to assess the problem or challenge being faced
Are innovation stories or experiences shared and communicated across the organisation and who is involved in this

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 19th June 2008
Location: Open University
Interviewee: Professor in Knowledge Technologies in the Knowledge Media Institute, Open University

Key Comments:

- **Explain background of project**

- **Opinions and advice about project**
  The current issues at MBDA are typical organisational challenges e.g. huge archives of data in different formant (handbooks, manuals etc…) leads to an accumulation of data and this can prove troublesome
  In order for knowledge sharing to be effective and take place a technology infrastructure must be in place, which is able to support a low-cost knowledge sharing process. While this 'low-cost' aspect is primarily related to the ease of use of the technology, it has also implications for the editorial knowledge sharing process. In a nutshell, the simpler and more direct the workflow, the more effective the process.
  In order for individuals to share knowledge an award or motivation needs to be in place and measured perhaps in appraisals; an organisation must weigh up the cost benefit of implementing this
  Organisations can use internal wikis and/or social networking to encourage and enable individuals to share knowledge. These mechanisms have proven to be effective and low-cost – see earlier bullet point.
  There must be acceptance and encouragement as well as an emphasis of best practices from top management for individuals to share knowledge
  A sharing and flexible culture be in place where management are prepared to lose control to some extent and allow employees to interact socially and be open with each other
  Virtual and social events can be run to encourage knowledge sharing and create an open more creative environment
  A common culture which is in line with how the organisation operates must exist between business units in order to allow efficient knowledge sharing and decision making

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 20th June 2008
Location: Cranfield University, Building 50
Interviewee: Head of the Decision Engineering Centre

Key Comments:

- **Explain background of project**

- **What is your view on innovation?**
  Innovation varies level to level (I am currently looking at the lowest level) it is about managing the area between designers and engineers and using past project knowledge and experiences for better future use.

- **What is your view on knowledge management?**
  Knowledge can be managed can be on a management level such as sharing best practices as well as on a corporate and micro level.

- **How can knowledge be shared or communicated across an organisation?**
  There are different ways to communicate knowledge; e.g. communities of practice, networks of expertise, knowledge sharing teams, through software such as WebEx meetings and conferences.
  However, some people may not want to share knowledge, this depends on the personal confidence of the person and how easy or difficult it is to share.
  Face to face meetings are essential methods of communication
  Having coaching and budding schemes in place to retain organisational knowledge
  IT becomes too old too quickly – having an IT team in place to support IT infrastructure will enable knowledge sharing, if one is not in place people solutions need to be identified and actioned

- **How much is knowledge sharing hindered in an organisation which is bound by secrecy?**
  In all cases individuals in organisations of this nature are typically security cleared. This should certainly not be a problem within an organisation in terms of knowledge sharing. Perhaps it may be a problem with people outside the organisation however individuals will be aware of what they can and cannot share.

- **How can knowledge sharing and individual's knowledge contributions be measured and should they?**
  Measuring this can divide people and all cases awards can be limited. It is useful to incorporate individuals' contributions into performance review and/or appraisals. A matrix of the rate of growth of juniors, the quality of the knowledge shared and measuring not only individuals' performance but also their team's performance can be measured to assess knowledge sharing and development success.

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 9th July 2008
Location: Imperial College London
Interviewee: Chair in Innovation Management and co-Director of the EPSRC/AIM collaborative programme

Key Comments:

- **Explain background of project**

- **Opinions and advice about project**
  ARAP – social network software Build architecture with key things
  Capability model with what next steps to take
  Good practice model
  Innovation manager own innovation process and are a catalyst for the innovation processes
  Which knowledge needs to come together at MBDA and how
  Link framework practices to literature

Company Study: Interviews

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 2nd June 2008
Location: MBDA Stevenage
Interviewee: Principal Engineer

Suggested topics:

- **Background of project**

- **Employee background**

- Systems/architecture background
- With company 22years
- Is currently in between roles
- Lectures on TF course - 'What is a missile?', 'Requirements and Verification Process', 'Lethality & Vulnerability', 'Operational Analysis' and design & tutor the course project.

- **Knowledge Management**

- KM should be applied in teams and projects
- KM is applied poorly in projects and across organisation.
- Aspects such as lessons learnt/information tools / working with foreign national subcontractors is not recorded.
- There is no recording of tacit knowledge and this is vital.
- Redundancies which are announced/made cause knowledge not be shared due to employee uncertainty about their jobs.

- **Innovation**

- Innovation is promoted mostly/only at senior levels and not encouraged amongst juniors.

- **Knowledge management and innovation**

- Technical experts hold repositories of data – this can be key to innovation however there is a resistance to share this information.
- The lack of effective knowledge inhibits innovation and new innovations.

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 2nd June 2008
Location: MBDA Stevenage
Interviewees: Head of Knowledge Management

Suggested topics:

- **Background of project**

- **Employee background**

- Head of KM (1 year) (31 years with company)
- Soft (Weapon?) systems engineer background. Also engineering (multi-discipline) management, functional management (people and skills), technical subcontract management.
- Encourages suitable behaviours by implementing activities/tools/processes which enable knowledge sharing/access to knowledge and the means to update it.

- **Knowledge management**

- Route plan, with several years worth of work, developed based around cores of
  - Learning from Experience
  - Skills & Competencies
  - Information Framework underpinned by Encouraging "Good" knowledge sharing Behaviours
- Current priorities (partially to increase the visibility of KM within MBDA and partially to get international tools in place to support later planned activities):
  - Internal Wiki – intranet which provides professional knowledge of MBDA routines /processes /procedures etc…and allows users to add and edit content. (We already have an Intranet for formal processes, procedures etc. The aim of the Wiki is to be more informal: capturing knowledge that people think others will find useful but that is not in the existing formal structure).
  - Yellow Pages – searchable database of employees and their backgrounds (skills and experiences)
  - Both tools are in their infancy and only a pilot version is currently being run.
- Is aware from workshops, personal experience and professional networks how knowledge is managed and what the demand is in terms of knowledge management tools and systems.

- **Innovation**

- Feels that there should be a knowledge manager/team leader and an innovation manager/team leader in each team. (May be same person).This will enable greater knowledge sharing and innovation.

- **Knowledge management and innovation**

- There is a definite link – if knowledge is not shared then innovations may be duplicated, not used or inappropriate for the business.

- Knowledge is not shared adequately. Not possible to "control" peoples behaviour. People need to be encouraged to change from the "what is in for me" mentality.
- Experiences are not transferred effectively enough.
- Knowledge should save time in the innovation process- is unsure if this happens.
- Teams are 1. Project based and 2. Functional based – there should be more interconnectivity between teams and roles
- There is no integrated or co-ordinated cross functional or cross project knowledge base, things are often duplicated not allowing innovative reinvention
- There are security issues inhibiting knowledge sharing that have to be respected
- Knowledge is often considered to be owned by the individual, not the team

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 4th June 2008
Location: MBDA Stevenage
Interviewee: Innovation Manager Italy

Suggested topics:

- **Background of project**

- **Employee background**

- With MBDA for 18 years
- Innovation Manager for just under 1 year
- Little resources in Italy – is starting rpm scratch in her position
- Connects with other directors and helps Marcello Pacifici – has to be multi-tasked
- Carries out interview with key top management to understand wants and needs

- **Knowledge management**

- When there is an issue Shirley asks her direct manager
- The intranet needs to be more interactive
- The innovation team is very virtual – they need to be made more known across the organisation and innovation needs to be promoted.

- **Innovation**

- Managers do not know what needs to be innovated – area/materials/products, i.e. what does the customer want?

- **Knowledge management and innovation**

- Knowledge management, innovation and intellectual property need to be linked.
- The solutions which people have learnt from boosters and workshops when used should be shared and used as 'lessons learnt'.
- Tacit experience and information is lost and this makes things harder when there are new projects
- There should be mentoring programmes put in place for people who are retiring so that knowledge is retained by junior employees.
- Information is not passed though or is not clear to managers and there is no flow of information from customers to the end person who needs to deliver.

- **Boosters**

- More presence from key people is important in meetings
- Technical experts are convinced that problems will be solved in the specific teams when the answer may be outside the team
- Technical/operations employees are the main internal customers.

- **Additional points**

- There is a lot of confusion with the word innovation *(Innovation – being open minded/taking nothing at face value/improving what is present/it is a mindset)*

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 4th June 2008
Location: MBDA Stevenage
Interviewees: Innovation Manager France

Suggested topics:

- **Background of project**

- **Employee background**

- With MBDA for 20 years
- Innovation Manager for just under 1 year
- Provides services to problems though boosters and front office activities
- Interview problem owner, designs an agenda and then organises and booster or facilitator workshop.

- **Knowledge management**

- Intranet contains news and contacts – this needs to be more precise and up-to-date.
- WSS (Windows Share point) shares international information – information which is important to share needs to be highlighted.

- **Innovation**

- Innovation needs to be pushed in functions/projects/deployed through sharing/ benchmarked against other organisations and driven through customers and clients.

- **Knowledge management and innovation**

- More accessible and beneficial knowledge needs to be available to aid the innovation tasks.
- People share knowledge but not on a wider/international level.

- **Additional points**

- There is very little feedback from internal customers.
- The steering committee and quality network need to be involved more in the innovation team
- Junior engineers and employees need to shadow employees for 1-2 years before they retire – line managers must plan for this and take it into account.
- EDR tools (data related) – are in the process of being set up and utilised more.
- *Innovation is a service / innovation is in teams*

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 4th & 27th June 2008
Location: MBDA Stevenage & MBDA Bristol
Interviewees: Innovation Manager U.K.

Suggested topics:

- **Background of project**

- **Employee background**

- Aeronautical Engineer
- With MBDA for 4 years
- Started on graduate engineering program
- Innovation Manager for 18 months
- Is currently working on Technology Integration, Evaluation & Demonstration for the SEAS DTC. (Engineering based)

- **Knowledge management**

- There is a need for knowledge tools and systems, but primarily a knowledge culture supported by flexible methodologies rather than prescriptive tools. (i.e. WSS or similar is not the answer)
- It would be beneficial to have information on 'lessons learnt' from past projects and experiences.
- The Yellow Pages directory in development, which lists contact details of employees in the organisation, needs to be up-to-date and contain relevant, sufficiently detailed and useful information.
- J drive is not maintained regularly enough - contains guidelines of processes for innovation managers to follow

- **Innovation**

- Being able to look for new ways of doing things through technical improvement, process and organisational improvement. It is then turning this into added value for the company.

- **Knowledge management and innovation**

- People need to be more future focused when or if they add data/knowledge to the intranet or otherwise.
- No strong knowledge base /system/tools/ methods to drive innovation.
- Innovation and knowledge management are not the same, but the conditions and corporate climate that facilitate a company being good at one will be very similar to the climate that supports the other.

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 9th June 2008
Location: MBDA Stevenage
Interviewee: Head of Intellectual Property

Suggested topics:

- **Background of project**

- **Employee background**

- With MBDA for 26 years
- Possess a great insight into MBDA as has seen it transform to what it is today (e.g. when it was AEROSPATIALE France)
- Is in charge of IP (patents, trademarks, protection of software/images etc…)
- Coordinator between all MBDA Companies (UK, FR, It, German)
- Holds talks in the TFC about IP
- IN, KM and IP worked effectively together and have monthly meetings forming communities of innovation.
- Is manager for 3 main areas:

1. Innovation award – assessed by team results and award is team based (A template is available to assist teams to put forward their idea/inventions)
2. Ideas award – individual award (Idea software available on intranet)
3. Intellectual Property – "The Best patent of the year" (2006 published patents)

- The 3 awards complement each other in terms of creating and promoting innovation, new ideas and awareness about IP regulations.
- Intranet is a tool to inform and patents portfolio available on intranet, other tools will soon be added. (filing patents application whole MBDA : about 30 patents per year)
- Technical process improvement is required but also human acceptance, culture and willingness to progress and share.
- There will soon be a relaunch of the process on an international scale for the way in which Ideas are assessed so that the process is quicker and more efficient.

- **Knowledge management**

- The intranet is not updated and maintained
- WSS – Yellow Pages is a good idea and is useful however is in its infancy
- More tools are required but also greater face to face contact with people

- **Innovation**

- Lessons learnt from all experiences, processes and projects should be captured and documented.

- **Knowledge management and innovation**

- Young people will commit to tools more
- To ensure knowledge is retained and used for innovation there should be a 6 month mentoring period with an employee who will retire.

- There is a trend that the same people and teams come forward each year for the awards.

➢ **Additional points**

- Juniors and older employees should work together
- Videos should be made and a bibliography formulated to capture the employees working and their habits and routines primarily in manufacturing.
- Employee roles are functional each job they do is not the only one they do and this means that there is no authority as employees have functional managers- there is no official organisational structure.
- There is conflict between functional managers as there is no defined reporting priority

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 13th June 2008
Location: MBDA Stevenage
Interviewee: Training Co-ordinator

Suggested topics:

- **Background of project**

- **Employee background**

- Physics degree
- Previously a navigation engineer for missile dynamics U.K.
- Now working for MBDA France - works with engineers to put together and deliver training courses for young engineers
- Is a training coordinator & lead facilitator for mostly technical courses
- Improves learning processes with engineers - there is a barrier between experts and new employees

- **Knowledge management**

- Intranet is useful but often not updated
- The WSS tool is also useful and gives people access to courses and project work
- Security passwords are too much and discourage people from accessing the WSS site
- Internal Wiki would be ideal but useful content needs to be developed
- A tool such as MBDA Google would be ideal, Eureka is the current tool but there is limited intranet content so it doesn't find much!
- KM tools would be successful if they were managed and maintained well
- Identify knowledge leaders and willing employees who want to share and reward them and make this need to contribute knowledge part of employees' jobs

- **Innovation**

- Innovation - the way MBDA copes with changing markets, technology and customers. Coping with change and the nature of the business changes by changing the way in which employees work to be more flexible and novel
- Informal networks are decreasing: over reliance on e-mail + open plan offices

- **Knowledge management and innovation**

- 'Modularity and Reuse' (team lead by the head of missile architecture) big initiative to catalogue things which are done
- The initiative promotes an innovative re-use of products and processes rather than starting from scratch

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 25th June 2008
Location: MBDA Stevenage
Interviewee: Performance Improvement Manager / Departmental Head for Technical Assistants/ U.K. Ideas Manager

Suggested topics:

- **Background of project**

- **Employee background**

- MBDA 20 years, 2 in current role. Before this was supporting systems engineering (business improvement)
- Performance improvement manager for technical directorate- 3/4 days per week, fairly new scheme (includes departments and functions across U.K., Italy and France/Andy Summers direct boss/Steve Wadey directs technical directorate)
- Department head for technical assistants. Responsible for placing technical assistants with suitable projects. (25 technical assistants dealing with technical and administrative duties) (Andy Summers boss)
- U.K. ideas manager – idea scheme administration, management and reviewing of ideas (Raymonde Lardiere boss)

- **Knowledge management**

- Knowledge management has to be done better; there is a large amount of tacit knowledge which is lost. Knowledge leaders are not identified although technical Experts are. (Alan identifies himself as a knowledge leader)
- Knowledge management is having a searchable well maintained database
- Technology can act as an enabler for knowledge sharing
- MBDA knowledge sharing culture is changing but still needs to be more open and flexible
- Incentives do not work, they can produce unrealistic ideas to be put forward
- Knowledge sharing performance could be incorporated into appraisal
- There needs to be a way to encourage people to share knowledge as this is actually part of their job. E.g. a soldier – it is his job to fight however when he goes beyond the expected he is rewarded with a medal (non-monetary)

- **Innovation**

- Innovation is products like the Dyson vacuum cleaner or the corkscrew.
- Innovation is radical ways doing things which have not changes for years which provide a tangible benefit
- There must be a balance between innovation and the risk which will take place if the innovation is executed
- R&D should work better and be more innovative

➢ **Knowledge management and innovation**

- There is a resistance to chance from people in skilled areas
- It is important to document experiences in order for reinvention and innovation to take place

➢ **Boosters**

- Has been a problem owner in a booster when they were first introduced at MBDA, the outcome was beneficial
- Maintains the view that perhaps an external innovation company is not needed now that the workshops have been introduced at MBDA and are being implemented

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 25th June 2008
Location: MBDA Stevenage
Interviewee: Head of Process, Methods and Tools

Suggested topics:

- **Background of project**

- **Employee background**

- Head of process, methods and tools – 2 years in role
- 6 years with MBDA
- Before current role was a technical expert for software process engineering
- Was with BAE systems – chair of CMMI Working Group and a Learning From Experience facilitator
- Looks at improving engineering processes (including manufacturing and logistics) and supports Heather Alcock with knowledge management

- **Knowledge management**

- Knowledge management – extraction of knowledge and using it in different circumstances
- Turing tacit knowledge into available explicit knowledge and gathering and deploying this knowledge
- MBDA is good at capturing knowledge but does not deploy it
- The intranet does not allow effective communication
- IT and senior management restricts innovative technology usage and advancement
- There is no incentive to share
- There is a resistance to share due to the organisational culture
- Knowledge leaders and technical experts are not identified or known widely across the organisation

- **Innovation**

- Innovation – rapid development / innovation activities / wacky / new ways of doing things /new ways of using mature technologies / radical thinking which leads to improvements

- **Knowledge management and innovation**

- Ability to use and extract knowledge for use in new and different fields and ways
- Getting people who have not done things before and letting them do new things

- **Boosters**

- Boosters do not derive positive results – outputs of boosters are rarely followed up or deployed. (Post interview thought: perhaps communicate some successes directly attributable to the booster?)
- There are too many facilitators who are not the 'right' people
- There are no measurements in place, feedback or record of boosters

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 25th June 2008
Location: MBDA Stevenage
Interviewee: Head of Technical Excellence

Suggested topics:

- **Background of project**

- **Employee background**

- Physics background
- With company for 33 years
- Part of steering committee
- Is the U.K. head of technical excellence- prevents projects getting into problems / has the final word on suitability of design and consequently decides whether to sign them off
- MBDA Chief Engineer
- Launched the innovation programme in about 1998 MBD

- **Knowledge management**

- Knowledge management and identifying knowledge leaders is important in an organisation
- There is inefficient communication between people
- Knowledge is managed by accident rather than systematically
- The difficulty is peoples' culture and attitudes and that people do not ask for knowledge
- Exploiting existing knowledge in a new way is beneficial
- A process of scoring if this already exists and specific rewards are in place (but not well publicised)
- People are too busy to share knowledge but it is not because they do not want to
- The hierarchical structure should encourage knowledge sharing, it currently does not

- **Innovation**

- Doing things of value, there is scope for it everywhere
- Innovation can be incrementally with everyone doing a little bit leading to a major benefit to the company
- There are very few inventions at MBDA

- **Knowledge management and innovation**

- Boosters are ideal to exploiting knowledge
- It would be ideal if the networks formed in a booster were copied into the daily routines of the organisation

- **Boosters**

- The boosters were meant to expose people to different ways of thinking

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 27th June 2008
Location: MBDA Bristol
Interviewee: Graduate Systems Engineer

Suggested topics:

- **Background of project**

- **Employee background**

- Mechanical engineering degree
- First experience of working with MBDA was on a summer placement (just over 2months) with the innovation office (2006) with Phil Anderson
- Systems Engineer at MBDA
- Currently on graduate scheme working in functional improvement with Christine Thomas

- **Knowledge management**

- *Keeping record of the brilliant methods, tools, processes and information in an accessible knowledge base and distributed widely*
- Knowledge is managed and shared in projects but is not company wide
- Knowledge management does not seem to be visible at MBDA
- Had brief encounter with work which required knowledge management assistance but this was not successful and has not yet been completed
- Recording lessons learnt and past experiences could be more efficient
- Knowledge management is important for the current 'modularity and reuse' trend
- Knowledge is shared but not as best as possible – doesn't seem to be actively shared
- IDEA scheme is not promoted enough, some rewards are given for suggestions rather than actual IDEAS
- Knowledge sharing should be part of the job and culture (in an ideal world)
- WIKI is a good idea and the Innovation Awards, to recognise innovative behaviour

- **Innovation**

- *Recognising ways of working which need to be improved and finding new ways to improve them by adopting new ways of working*
- Innovation is particularly important for technical and research progression at MBDA
- Innovation is important in areas where there are existing process e.g. the way in which people work
- When on summer placement with innovation office – coordinated and organised boosters and workshops as well as being responsible for administrative work such as maintaining a database with information of boosters, workshops and facilitators
- As an innovation manager – raise awareness of innovation activity as much as possible and make innovation and an innovation manager as visible as possible across the organisation

➢ **Knowledge management and innovation**

- Knowledge management can only be a tool to support innovation
- Reuse experiences and reapply innovative practices
- It is important to people to have access to available knowledge to build on what has already been done without trying to reinvent the wheel all over again

➢ **Boosters**

- There are some records kept of Boosters but not all workshops are officially branded by innovation programme
- No formal reports are written but Booster output is written up in PowerPoint
- Innovation database – time consuming and not all data is captured. Hard to record all innovative activity.

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 27th June 2008
Location: MBDA Bristol
Interviewee: Technical Advisor

Suggested topics:

- **Background of project**

- **Employee background**

- Engineering background
- Executive
- Interested in complex and ad hoc problems

- **Knowledge management**

- Storing data
- Poor knowledge management at MBDA
- People confuse knowledge with data
- WSS is an improvement to the past but the intranet is poor
- There are too many technical rules
- The product base leads to technical barriers and national security rules also introduce barriers
- There are no enablers to share knowledge

- **Innovation**

- Innovation is fairly good at MBDA
- There are too many workshops/boosters
- The problem space is not identified or expressed well

- **Knowledge management and innovation**

- There was once a bulletin board by Lotus but this was shut down due to management feeling they has lost control

- **Boosters**

- Beneficial because pieces of work are done without people feeling they are working
- All the boosters I had run through the Innovation Office there was significant follow up in accordance with their process
- There are management problems which hinder boosters
- There are too many rules for the boosters , these are the product, national interest and security barriers mentioned
- Boosters are less stressful than workshops. Boosters if well managed are less stressful than brainstorming. The word ‘booster’ had been demeaned in some way , was used often pejoratively and that I have started to use the word ‘workshop’ in preference to the word ‘booster’ to avoid this issue.

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 27th June 2008
Location: MBDA Bristol
Interviewee: R&D Advisor to Director of Future Systems

Suggested topics:

- **Background of project**

- **Employee background**

- Aeronautical Engineer / mathematics control systems / electrical engineering
- Currently R&D advisor to director of future systems
- Works with Cranfield University to develop the innovation gateway / relationship with MOD / develops strategies to obtain new sources of funding

- **Knowledge management**

- Culture + tacit knowledge + experience
- MBDA has good and bad parts of knowledge management
- KM is good in individual teams but not across teams and functions
- There are barriers to sharing, e.g. time constraints, teams are project orientated, databases are limited
- Knowledge sharing is part of a person's job although people see it as additional work
- Yellow pages should be kept up to date

- **Innovation**

- Finding new ways and ideas of doing things which are not necessarily technical and being open to ideas all the time
- There are numerous innovation initiatives but the difficulty is getting people to understand and do them
- Working in processes hinders innovation but that is the nature of the work

- **Knowledge management and innovation**

- Problems and knowledge should be shared to enable innovative solutions

- **Boosters**

- There are benefits if run properly
- The planning part of workshops and boosters is not as effective or realistic as possible
- There is no authority of implementing the outcomes of the workshops/boosters
- The problem owner and facilitator should write a report at the end of each workshops/boosters – everything should be documented and shared

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 29th July 2008
Location: MBDA Stevenage
Interviewee: Head of Knowledge Management, Intellectual Property, Innovation and Technical Institute

Suggested topics:

- **Background of Project**

- **Employee Background**

- 1 year in current role
- 5 years in technical directorate for advanced project
- 4-5 years in the program directorate as a project manager
- 3-4 years in export sales directorate
- 3-4 years in procurement directorate (head of major equipment)

- **Knowledge management**

It is key to MBDA – to bring together knowledge from across all branches of MBDA and not work in silos.
Knowledge management is to be structured by tools and processes with the 4 main pillars:

- **Access** to the knowledge of our people (what they do and what they did ?)
- **Share** the knowledge across teams
- **Capitalise** knowledge all *along the life* of a project and then make it accessible to other projects
- **Transfer** the knowledge from leavers to successors

W drive: It is a place that should be used for *storing* data at a working level. A policy should be established with three main levels of data – store (W/J drive) / share (WSS) / communicate (intranet). The experience shows that the most accessed pages are the directory and the HR information pages. We have to be realistic when implementing the innovation page on the intranet. It should be very pragmatic and simple and answers to the following questions:

- why innovating
- what kind of services are available to help support innovation
- who I shall contact for theses services
- how do work these services
- Examples of what have been achieved during the year

There is no common international process within the innovation office; it is different in all the countries. This a clear improvement axes for the team and we will start the design of an international process applicable across MBDA in October.

➢ **Innovation**

- The objective of innovation is to develop MBDA positioning in the market, which is mainly to say: improve time to market, how to meet customer needs in a shorter time, improve our cost base and to be able to deliver products in a shorter time period. A series of Think Tanks have been launched in October 2007 by our CEO and their outputs have now clearly defined a roadmap to our innovation strategy at Company level (market / Products & Services / Technologies).
- Innovations is not directly made by the innovation team but the innovation team acts as a key enabler by supporting all innovative initiatives across MBDA ranging from commercial to technical activities. It is important to note that innovation should come from all employees and the different teams across MBDA. Innovation is about taking risks and … admits potential failures, encouraging people to be even more open minded, to challenge the status quo, to share their views with others, …, and recognizing them when they succeed.

➢ **Knowledge management and innovation**

One of the most obvious links is to build new ideas from existing ones (internal or external) – the purpose is "not to re-invent the wheel every time but to continuously improve it".
Another example is the collaborative idea tool where people build new ideas from other's ideas; this is a very powerful scheme to be explored within MBDA.
In that sense, Knowledge management is a key enabler of innovation as in the same way it is an enabler to many areas across the company.

➢ **Boosters**

Workshops – informal meeting/*session* where some part of booster techniques may be used
Boosters – kind of workshop but more specific using creative problem solving techniques
People need to be aware that we don't only provide boosters – we provide other type of services which are tailored (content / duration) to the customer's request

➢ **Additional Points**

Idea scheme touches all employees with a wide range of idea submitted (from someone in the assembly shops suggesting a machine / tool changing to someone proposing more internet wires in a conference room).The use of the IDEA scheme will be improved to enable MBDA to capture more ideas from across MBDA. Ideas are currently slightly declining and the assessment of ideas clearly needs to be faster.

Industry Study: Booster Questionnaires

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 24th July 2008
Location: Via Email/Telephone
Interviewee: Innovation Manager U.K.

Booster Questionnaire

From a lead/support facilitator's and participant's perspective

Aim of questionnaire: To understand the stages in the boosters; the planning stages, formal outputs and benefits to attendees of the boosters, facilitators and problem owners.

- **Please state if you have been a facilitator/ problem owner or support facilitator**
  Lead facilitator/support facilitator/attendee (Only need more than one facilitator if problem is complex and large group or for training)

- **Your personal definition/meaning of:**
  Booster: taking a workshop and making it more efficient with creative problem techniques and facilitators to maximise efficiency
  Workshop: situation where a number of people get together in a room in an environment that is different from their day job but not necessarily different thought process or methodology
  Purpose: trying to solve problem or situation/move forward people keen to use booster for brainstorming environment
  Facilitators are gotten in touch with mostly by word of mouth

- **Planning stage**

- Is there a process which is followed when putting together the boosters?
- How is it decided that a booster should take place – who decided this?
  Contact innovation manager/sometimes people contact facilitators/people do not know who facilitators are there is a rough process to put together boosters – meet problem owner – establish situation/problem -
- How are participants contacted – where is the information or suitability stored?
  Problem owner tells innovation manager who needs to participate/IN manager suggests other participants

- **During the Boosters**

- How is information captured
  All ideas written down by participants during the booster
  Pictures taken of information
  Facilitators should ask problem owner what is required in terms of write up
- Who captures any important information

Depends on situation – innovation team/secretary of problem owner/anyone

- Are there any feedback opportunities set up for any members of the boosters to contact either the problem owner/lead facilitators/support facilitator. Informally people know each other/feedback forms – 50% feedback
- Are the boosters reviewed for improvement – who does this?
  After every event as part of facilitator training programme it is encouraged that facilitators at that event to have a debriefing. (about 120 have been on facilitator training course) in practice only a handful of people really prepared or experienced and skilled to coordinate booster

➢ **Follow up Reports**

- How/why are they created
  Reports are created on the wishes of the problem owner
  Better communication of what has happened should take place
- Who created them or are they created
  Report created by (detailed analyses of how to proceed) problem owner/facilitator digitise proceedings of event
- Where are they kept
  Raw output of event stored on network drive for U.K. events – do not have international network. Follow up down to problem owner one of rules of innovation teams to conduct follow interviews 6 month down the line (becoming more efficient)
- Who uses them
  Innovation team use outputs for lessons learnt and where improvements can be made
- Who can access them / how many times have they been accessed
  Not sure what should be available to wider population – no common place where attendees from boosters can communicate on
- Was the problem owner contacted for feedback and follow up
  See above
- Does the innovation office keep in contact with the problem owner to track changes after booster
  See above
- Are the reports distributed – who does this?
  Depending on problem owner
- Who sets the format of the report – is this set?
  Innovation managers designed them
- What are the results from the 'problem owner questionnaires'? Are they sent back – is this data actually analysed or looked at?
  Useful feedback reported on at monthly meetings – otherwise stored on J drive and used to analysed trends work is stand alone as not connection between U.K. France and Italy + security issues. Certain amount of resistance (cultural/historical/lack of security understanding) from problem owners to share information across nations

➢ **Results of Boosters (N/A was not problem owner)**

- Did you learn anything?
- Was it useful – how?

- Has it changed your behaviour as a result?
- Have you applied anything back to your job?
- What was the output?
- Did you gain any knowledge

➢ **Other**

- IAF Foundational Competencies for Certification - do the facilitators meet these competencies at all?
  Not necessary for people to be accredited facilitators but should be used as guidelines for facilitation development
- Due to the fact that there are so many facilitators do they meet to discuss common issues/problems?
  - Is usually introduced by innovation team
  - Should be more community interaction and people could be made aware of facilitation skills
  - People cannot be forced to go to events but can be enabled people to come for a good reason to participated/engage people

➢ **Top improvements**

- Availability and skill of facilitators
- Better communication of output and follow up activities

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 29th July 2008
Location: Via Email/Telephone
Interviewee: Technical Advisor

Booster Questionnaire

From a problem owner's perspective

Aim of questionnaire: To understand the stages in the boosters; the planning stages, formal outputs and benefits to attendees of the boosters, facilitators and problem owners.

- **Please state if you have been a facilitator/ problem owner or support facilitator**
  Problem Owner

- **Your personal definition/meaning of:**

- Booster: Booster has become a pejorative term in some circles in MBDA. However there is an area of idea generation which requires a lot of imaginative exploration and I would put this in a 'boosting' category. But you'd need to be selective about the participants and the audience for the outcome.
- Workshop: Something more focused requiring clarity of shared thinking an agreed outcome. Boosting techniques can be judiciously employed to determine clusters, decision flows, blockers etc.

- **Planning stage**

- Is there a process which is followed when putting together the boosters? Yes
- How is it decided that a booster should take place – who decided this? Owner
- How are participants contacted? Where is the information or suitability stored? In my experience the owner should invite participants with an introductory letter.

- **During the Boosters**

- How is information captured? Photos and 'office tools'
- Who captures any important information? Facilitators
- Is this information (assuming important information has been captured) disseminated or used? Yes
- Are there any feedback opportunities set up for any members of the boosters to contact either the problem owner/lead facilitators/support facilitator? Not in a formal way under the manner of the Innovation Office – as far as I am aware.
- Are the boosters reviewed for improvement – who does this? I've been to one booster 'booster' (a bit incestuous) where the Innovation office and a selected few were given opportunity to express thoughts about good and bad experiences. Not sure how the team developed this.

- **Follow up Reports**

- How/why are they created? To encourage owners to act properly on the Action Plans of the booster

- Who created them or are they created? The Action Plans are produced in the booster
- Where are they kept? Owners and (I imagine) the Innovation Office keep copies.
- Who uses them? Owners.
- Who can access them / how many times have they been accessed? Not sure this is an issue.
- Was the problem owner contacted for feedback and follow up? Yes.
- Does the innovation office keep in contact with the problem owner to track changes after booster? Yes – while it's meaningful.
- Are the reports distributed – who does this? I hope not.
- Who sets the format of the report – is this set? Framework set by Innovation Office but material generated in the booster may be different – it's a booster thing.
- What are the results from the 'problem owner questionnaires'? Are they sent back – is this data actually analysed or looked at? Don't recognise this.

➢ **Results of Boosters**

- What was the output? Diverse – organisational, systematic – different ways of looking at problems.
- Did you gain any knowledge? Yes
- Did you learn anything? How people behave. How other people think about problems. When to avoid boosting.
- Was it useful – how? Sometimes. Genuine resolution of some difficult technical and organisational challenges.
- Has it changed your behaviour as a result? I hope so.
- Have you applied anything back to your job? Yes. Have tried to use some simple 'on the spot' techniques in ordinary job contexts, like detective listening, brain pooling, voting, clustering, etc.
- Has this change/results been followed up/recorded by the innovation team or otherwise? Probably not in a formal sense.

➢ **Other** (N/A not a facilitator)

- IAF Foundational Competencies for Certification - do the facilitators meet these competencies at all?
- Due to the fact that there are so many facilitators do they meet to discuss common issues/problems?

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 30th July 2008
Location: Via Email/Telephone
Interviewee: Principal Engineer

Booster Questionnaire

From a participant's perspective

Aim of questionnaire: To understand the stages in the boosters; the planning stages, formal outputs and benefits to attendees of the boosters, facilitators and problem owners.

- **Please state if you have been a facilitator/ problem owner or support facilitator**
  No. Only attended the course a few weeks ago.

- **Your personal definition/meaning of:**

- Booster: A method of exploring a 'problem statement or investigate a specific topic' with the assistance of colleagues with varying backgrounds.
- Workshop: A tutorial/course on a specific topic that is pertinent to MBDA business. It is aim of a workshop to contribute (with diverse views) as it is to gain knowledge.

- **Planning stage**

- Is there a process which is followed when putting together the boosters? I am not aware of a formal company process on managing a booster.
- How is it decided that a booster should take place – who decided this? Funding is the first issue. If the problem can not be resolved with the project/department level – a problem owner is nominated. The 'problem owner' contacts the Innovation Office for help planning a booster.
- How are participants contacted? Where is the information or suitability stored? The list of participants are initially generated by the 'problem owner' – the 'must invite people' (probably ex- colleagues, people have attended past boosters, etc.). I would hope that there is a list of 'potential' participants that the Innovation Office can call upon.

- **During the Boosters**

- How is information captured? All information (via post-its, flip charts, etc.) is the responsibility of the facilitator/workshop-tutor. It is the facilitator's task, following a booster, to collate and 'writ-up' the contributions and submits to the 'problem-owner'. It is the responsibility of the 'problem-owner' who should receive the output or how to progress the actions or ask a select number of participants to discuss the issues from the booster.
- Who captures any important information? The 'problem-owner'.
- Is this information (assuming important information has been captured) disseminated or used? It should be matter of courtesy, by the 'problem-owner' to distribute issues from the booster to all the participants. However, this is rarely done!

- Are there any feedback opportunities set up for any members of the boosters to contact either the problem owner/lead facilitators/support facilitator? No!
- Are the boosters reviewed for improvement – who does this? I am not aware of this. I would guess that the Innovation Office should take the lead on this issue.

➢ **Follow up Reports**

- How/why are they created? Justification of the funding, but created for progressing the problem statement.
- Who created them or are they created? 'Problem-owner' – should be in a form of an internal report with restricted distribution.
- Where are they kept? With the 'Problem-owner'. I do not believe (not to my knowledge) there is a formal 'data-bank' of 'reports' from past boosters. Innovation Office should hold a copy of all outputs from boosters they manage.
- Who uses them? The 'Problem-owner' and project/department. If the problem statement is a company wide issue – this is communicated to all MBDA personnel via the intranet, in a 'sanitised form'.
- Who can access them / how many times have they been accessed? Not known to me.
- Was the problem owner contacted for feedback and follow up? No
- Does the innovation office keep in contact with the problem owner to track changes after booster? Not known to me.
- Are the reports distributed – who does this? Not known to me.
- Who sets the format of the report – is this set? Not known to me.
- What are the results from the 'problem owner questionnaires'? Are they sent back – is this data actually analysed or looked at? Not known to me.

➢ **Results of Boosters**

- What was the output? An e-mail from the 'organiser' – major points arising and action plan.
- Did you gain any knowledge? Yes.
- Did you learn anything? Yes.
- Was it useful – how? Yes. The last one ('How can MBDA better manage foreign sub-contractors') attended was very useful, and established issues on the subject matter that I had not experienced directly. All attendees were able to put their points-of-view and an agreed action plan proposed.
- Has it changed your behaviour as a result? Yes. The company in question were presented with the results and their behaviour/work-ethics also showed improvement.
- Have you applied anything back to your job? Yes.
- Has this change/results been followed up/recorded by the innovation team or otherwise? This was organised by the project – Innovation Office were not involved.

➢ **Other**

- IAF Foundational Competencies for Certification - do the facilitators meet these competencies at all? I am not sure if the MBDA facilitators have been introduced to this association or indeed, MBDA have signed-up to this body? I can not remember at the facilitator's course I attended that this was mentioned.
- Due to the fact that there are so many facilitators do they meet to discuss common issues/problems? Not known to me.

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 31st July 2008
Location: Via Email/Telephone
Interviewee: Principal Engineer

Booster Questionnaire

From a facilitator's perspective

Aim of questionnaire: To understand the stages in the boosters; the planning stages, formal outputs and benefits to attendees of the boosters, facilitators and problem owners.

- **Please state if you have been a facilitator/ problem owner or support facilitator**
  Facilitator (for 'booster' for small team of relatively new recruits on company's technical Induction Course (the Technical Foundation Course or TFC) addressing design concept issues for a Weapon System)

- **Your personal definition/meaning of:**

- Booster: Group Session held to try to significantly advance the approach to an issue, usually of a highish level and/or a complex nature, by adoption of various techniques intended to foster innovative thinking.
- Workshop: Group Session held to try to advance the approach to an issue, sometimes involving a system design choice, and sometimes involving external personnel (e.g. customers).
  (I'm afraid these are still a bit loose…)

- **Planning stage**

- Is there a process which is followed when putting together the boosters? Nothing formal for these particular ones… -just a somewhat condensed version of the 'proper' full 3-diamond process applied to the specific course project.
- How is it decided that a booster should take place – who decided this? Boosters have come onto the TFC to help inculcate a cultural approach of an innovative nature, (and at the moment they are somewhat complementary to and partly overlap the 'expert sessions' held later on in the course).
- How are participants contacted? They're there on the course. Where is the information or suitability stored? They're there on the course.

- **During the Boosters**

- How is information captured? Post-Its, Flipcharts, etc
- Who captures any important information? Team Members, mainly
- Is this information (assuming important information has been captured) disseminated or used? It's largely left up to the team, but there's an opportunity to refer to it at the final presentation that the team make at the end of the course.
- Are there any feedback opportunities set up for any members of the boosters to contact either the problem owner/lead facilitators/support facilitator? This 'booster-ette' has to be squeezed into a very short space during one evening of the course, so

effectively I try to incorporate feedback as we go along, and 'wrap it up' at the event. I may be around for further informal discussions afterwards, and I try to compare notes with the other teams' facilitators.

- Are the boosters reviewed for improvement – who does this? This is done informally, partly by making notes on an individual basis and partly by comparing observations among facilitators and with the course co-ordinator. Largely at my instigation, I might add, which reminds me that the course has gone through a somewhat curious series of evolutions, having been more-or-less suspended at one stage in the 1990s and resurrected with little reference to the historic (relatively successful) model but over the last perhaps 5 years has been developing more positively- though, perhaps, still more effort might be made to solicit feedback and to incorporate lessons learnt...

➢ **Follow up Reports**

- How/why are they created? Not really done. Teams may chose to refer to the booster session at the final presentation that the team make at the end of the course, but their designs may evolve to a point where the booster output bears no recognisable relationship…
- Who created them or are they created? This is at the particular team's discretion. Time pressure is a factor.
- Where are they kept? Flipchart paper in the team's HQ room or the team-leader's hotel room.
- Who uses them? The team.
- Who can access them / how many times have they been accessed? The team, during the rest of the week, maybe more maybe less often.
- Was the problem owner contacted for feedback and follow up? Not specifically. I try to get sight of a copy of the team's final presentation as part of my own washing-up/ debriefing efforts.
- Does the innovation office keep in contact with the problem owner to track changes after booster? No. My efforts above are the nearest equivalent.
- Are the reports distributed – who does this? No. The final presentations eventually go onto the TFC WSS area.
- Who sets the format of the report – is this set? No. Advice is given for topics to consider in the final presentations.
- What are the results from the 'problem owner questionnaires'? N/A Are they sent back – is this data actually analysed or looked at? N/A

➢ **Results of Boosters**

- What was the output? The team's final presentation.
- Did you gain any knowledge? A little.
- Did you learn anything? Yes, wrt facilitating boosters etc
- Was it useful – how? Yes, wrt making progress in a hurry
- Has it changed your behaviour as a result? Gradually increasing self-confidence
- Have you applied anything back to your job? Nothing specific on this occasion, but previous TFC projects have sometimes overlapped with subsequently arising 'work' projects which has helped.

- Has this change/results been followed up/recorded by the innovation team or otherwise? No. Tho' my manager has noted something along the lines of 'Gradually increasing self-confidence'.

➢ **Other**

- IAF Foundational Competencies for Certification - do the facilitators meet these competencies at all? Pass.
- Due to the fact that there are so many facilitators do they meet to discuss common issues/problems? This is done informally between TFC experts and TFC facilitators, partly by making notes on an individual basis and partly by comparing observations among facilitators and with the course co-ordinator. At least partly at my instigation, I might add.

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 31st July 2008
Location: Via Email/Telephone
Interviewee: Principal Engineer

Booster Questionnaire

From a problem owner's perspective

Aim of questionnaire: To understand the stages in the boosters; the planning stages, formal outputs and benefits to attendees of the boosters, facilitators and problem owners.

- **Please state if you have been a facilitator/ problem owner or support facilitator**
  Problem Owner ('suitable' problem for use on a training course)

- **Your personal definition/meaning of:**

- Booster: Group Session held to try to significantly advance the approach to an issue, usually of a highish level and/or a complex nature, by adoption of various techniques intended to foster innovative thinking.
- Workshop: Group Session held to try to advance the approach to an issue, sometimes involving a system design choice, and sometimes involving external personnel (e.g. customers).
  (I'm afraid these are a bit loose…)

- **Planning stage**

- Is there a process which is followed when putting together the boosters? Yes
- How is it decided that a booster should take place – who decided this? Generally this would be between highish level departmental representatives and facilitators.
- How are participants contacted? E-mail, sometimes informal 'sounding' beforehand by phone etc
- Where is the information or suitability stored? Erm, don't know. Various people's heads?

- **During the Boosters**

- How is information captured? Post-Its; digital photos of resulting flipchart paper etc.
- Who captures any important information? Problem holder, facilitator and possibly attendees all together. Not sure this is well-defined or tightly prescribed (room for negotiation).
- Is this information (assuming important information has been captured) disseminated or used? Generally yes. (See 'wash-up' etc below)
- Are there any feedback opportunities set up for any members of the boosters to contact either the problem owner/lead facilitators/support facilitator? Not explicitly, but I would hope that they'd be welcomed to participate in the 'wash-up' process in which problem holder and facilitator(s) review the event and outcomes, and any notes are prepared for publication.

- Are the boosters reviewed for improvement – who does this? I believe so- partly informally by comparing notes among facilitators, and partly by the innovation office/ Argenta etc.

➢ **Follow up Reports**

- How/why are they created? For 'formal' capture of ideas etc to save re-inventing wheels
- Who created them or are they created? Problem holder, facilitator and possibly attendees all together.
- Where are they kept? Innovation office? Department library of Information Bulletins.
- Who uses them? Department members; possibly other booster attendees.
- Who can access them / how many times have they been accessed? Department members and anyone on the distribution lists. Which reminds me: if we had an intranet and a softcopy library culture we might save a lot of wheel-reinvention.
- Was the problem owner contacted for feedback and follow up? No (this was a training session).
- Does the innovation office keep in contact with the problem owner to track changes after the booster? Don't know.
- Are the reports distributed – who does this? Within department the library is accessible, and where a report seems to be of particularly widespread interest we may send an e-mail to alert personnel.
- Who sets the format of the report – is this set? Not set.
- What are the results from the 'problem owner questionnaires'? Are they sent back – is this data actually analysed or looked at? Don't know.

➢ **Results of Boosters**

- What was the output? Mainly personal insight into communications shortcomings.
- Did you gain any knowledge? Some extra insight into how we are perceived externally.
- Did you learn anything? Yes
- Was it useful – how? As a training session, and as above
- Has it changed your behaviour as a result? Not as much as I'd like…
- Have you applied anything back to your job? Yes
- Has this change/results been followed up/recorded by the innovation team or otherwise? No

➢ **Other**

- IAF Foundational Competencies for Certification - do the facilitators meet these competencies at all? Pass
- Due to the fact that there are so many facilitators do they meet to discuss common issues/problems? Yes, sometimes more and sometimes less formally…

Industry Study: Interviews

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 16th June 2008
Location: MBDA Stevenage
Interviewee: Business development

Suggested Topics:

- **Explain background of project**

- **Employee background**
  Business development consultant, intermediary in companies

- **Innovation**
- Innovation is the commercial exploitation of ideas new to the company or sector. Innovation agents act like glue across organisation

- **Knowledge Management**
- Is the basis of the business
- Virtual meeting places are useful

- **Knowledge Management and Innovation**
- Framework to motivate sharing and provide an incentive to network
- Identify critical people and nodes in network

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 23rd June 2008
Location: Via Email/Telephone
Interviewee: Open Innovation Champion - Cadbury

Suggested Topics:

- **Explain background of project**

- **Employee background**

- As an open innovation champion – look outside for new ideas / carry out presentations to promote innovation / communicate face to face, via BT conferencing and through presentations to inform people of the benefits and successes of workshops and open innovation

- **Knowledge management**

- An intranet is used as a tool for communication however face to face and video conferencing is the most efficient form of communication

- **Innovation**

- Brining new science and technology to products and/or process to give market advantage to the organisation
- Open innovation is additional to conventional innovation because it looks externally to other people or technology and brings them into the organisation rather than just in house for solutions or innovative ideas
- Looking both internally and externally as a combination for solutions is the most useful approach. Makes sense to decide whether the project will a) happen faster using external resources/ideas, b) lead to a better product using external ideas, and c) provide a better risk profile if use external resources
- The biggest barrier is individuals' ways of thinking in terms of their corporate position and technical thinking

- **Knowledge management and Innovation**

- Cadbury's has innovation workshops either run by internal or external people or going out to innovation centre
- The workshops promote creative thinking and can also be technical workshops
- The workshops break and have broken down barriers between people and groups

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 24th June 2008
Location: Via Email/Telephone
Interviewee: R&D Director - PepsiCo International

Suggested Topics:

- **Explain background of project**

- **Background**

- Manufacturing background, with Pepsi 12 years. U.K. 3years, abroad 9 years. Moved to Holland in 2003 to re-establish R&D centre, has been numerous countries around the worked with PepsiCo and now back in the U.K.
- R&D Director works for Vice President in R&D for U.K. and Europe, works on building capability of function and on open innovation

- **Knowledge Management**

- Tools – now putting better knowledge management tools such as an internal Wiki into place and building connected databases, trials are currently being run.

- **Innovation**

- Driven by consumer needs - consumer research carried out / anticipate consumer needs and take action / marketing and R&D work closely together to acquire insights which will drive innovation
- Innovation – 'doing something which genuinely meets and more importantly exceeds customer expectations'
- 2 types of innovation – incremental and platform innovation – platform innovation increases category range and maintains supermarket relationships strong and enables shelf base growth. New platform usually need intensive capital to build production line and is step change innovation to justify the investment
- Barriers exist between functions and managing timelines geographically can be challenging

- **Knowledge Management and Innovation**

- Brief comes from marketing and / or R&D based on consumer insights that have been gathered. e.g. preference testing. The brief is then agreed and goes through various gate stages, which require approval from functional heads (eg, Sales, Finance, Marketing, Operations, R&D). Workshops take place from an R&D perspective for anticipated challenges of products with the customers and consumers in mind. A TAB (technical advisory board) may be called in for these workshops.

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 26th June 2008
Location: Via Email/Telephone
Interviewee: Consultant – whatifinnovation

Suggested Topics:

- **Explain background of project**

- **Background**

- Consultant with whatifinnovation (3 years to present)
- Began as a junior inventor
- Works in all areas of innovation with numerous organisations
- Was previously at Unilever for 5 years
- Assistant Director of the Brent Eton Summer School

- **Knowledge Management**

- People behave in line with signals management send out
- People are responsive to incentives

- **Innovation**

- About looking at things in new and different ways to unlock growth
- Innovation can be in different forms, e.g. experience/products/organisation/brands etc…
- P&G- open innovation has been a huge success
- Reaction to innovation in an organisation depends on the different people in an organisation
- Organisational politics, structures and the inability to look differently at things can be a barrier to innovation
- People may feel that their ideas are not relevant to management
- Innovation should be embedded in the way a business runs and what they value
- The nature of business should not hinder innovation
- An organisation should give people space show that innovation is valued

- **Knowledge Management and Innovation**

- Successful innovation should be celebrated and made public across an organisation

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 8th July 2008
Location: Via Email/Telephone
Interviewee: Business Development & Customer Manager - BAE Systems

Suggested Topics:

- **Explain background of project**

- **Background**

- BSc & PhD - Electronics Engineering, telecommunications
- Research & Development since 1978.
- Business Development & Customer Manager
- BAE Systems
- Technology & Engineering Services
- Systems Engineering Innovation Centre
- Loughborough

- **Knowledge management**

Knowledge management within an organisation (in my simplistic view) relates to the organisation's ability to harness the information generated from within (and without) in a useful and efficient manner, thereby, delivering know-how to the resource within this organisation in the form of expertise, capability, process and best practice on time and in a format that is fit for purpose. In other words, knowledge management relates to how information is stored, processed and accessed as capability enhancing intelligence.

- **Innovation**

Innovation is critical to the success of ALL types of organisations and ventures – industrial, academic, governmental, service or product. Taken to mean the exploitation of ideas for a beneficial purpose, innovation enables organisations to attain an advantageous position (market-wise) with respect to competitors. In essence, innovation enables evolution, growth, redirection, sustainability and flexibility. For the aerospace and defence industries, innovation is key to the delivery of complex (and evolving) systems over, extraordinarily, long lifecycles and product lifetimes. Through innovation, these industries are able to integrate new developments with legacy (sub) systems as well as respond to evolving requirements. Working Groups (WG) tend to be the main vehicle for sharing (technical) knowledge using the company-based IT infrastructure (Intranet). These WGs are formed on a "need to have" basis and tend to have definite lifetimes of existence. Other means of knowledge exchange/sharing within the organisation tend to be ad hoc or piecemeal; within departments, groups, business units etc. The mechanisms can vary from official (or not) reports (electronic and/or hard

copy) or e-mail. The company's intranet / website is a major source of information, particularly that relating to processes, guidelines, best practice as well as general news updates. This platform for knowledge sharing is particularly useful for common practices, style-guides, pro-forma, top-level statistics and publicity as well as for company rule and regulations. There are various levels of secrecy and confidentiality – concentric set of circles. Access to information/knowledge is, generally enabled by associated levels of clearance (of the accessing individuals). Generally, this is not a problem with password protection etc – however, for multi-party / multi-national collaborative projects this may, in a few specific examples, prove to be a challenge. Subset / separate intranet based networks are set up for such purposes. The process of sharing knowledge is very different from that of sharing data. Knowledge is how the data is made to be useful for the intended recipient at that particular moment of time. At one extreme end of this argument is the dissemination of masses of data across the entire organisation which is of little use to most. The other extreme is one where data is not shared at all! The measure / metric is therefore how effective has this data been in advancing the knowledge of the organisation/recipient. This metric is clearly not easy to ascertain or quantify. Key to this aspect are two issues, namely; (i) training and education on how and when to disseminate / share knowledge effectively and (ii) an intelligent IT engine able to process and tailor the data into useful knowledge. Rewarding individuals becomes irrelevant if the infrastructure and the training are in place.

- **Knowledge management and innovation**

Innovation is intimately linked to knowledge management from two perspectives; (i) technical innovations in terms of IT, data storage, visualisation techniques, intelligent agents and similar algorithms and (ii) the structure of the knowledge – appropriateness and timeliness. The two are vital to enable maximum exploitation.

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 31st July 2008
Location: Via Email /Telephone
Interviewee: Research Fellow/R&D scientist/product developer – P&G

Suggested Topics:

- **Explain background of project**

- **Background**

- Research Fellow/R&D scientist/product developer at P&G for 27 years
- Professor of Industrial Design at Central St. Martin's College of Art & Design in London

- **Knowledge Management**

We have sophisticated systems in place. There are established Communities of Practice that connect people with common interests but who work in different business areas e.g .fibres are used in beauty care and laundry. In addition, we are each required to write monthly reports that are made available throughout the organisation.

- **Innovation**

Innovation is the lifeblood of the P&G organisation. The key for us is the establishment of long-lived brands with a powerful equity. Innovation is the routs by which we develop the added-value of each brand. Personally, innovation relates to "making new stuff happen". It's the oxygen of work for someone like me.

- **Knowledge Management and Innovation**

- We have IT systems that allow questions to be asked across the organisation. In addition, knowledge is shared openly ONLY if there is no sense of personal risk and there is some sense of reward. This is a question of culture/climate. Upstream innovation requires a degree of risk along several vectors. The sharing of background information is often a judgement call. I tend to lean forward on this. I have NEVER seen an example where there have been serious repercussions from early sharing of information.

Developing a Knowledge Management Framework for an Innovation Team

Interview Date: 31st July 2008
Location: Nissan Technical Centre, Cranfield
Interviewee: Manager of Business Efficiency and Organisational Change

Suggested Topics:

- **Explain background of project**

- **Background**

- Engineering background – Currently Manager of Business Efficiency and Organisational Change at Nissan Technical Centre

- **Knowledge management**
  Knowledge management is about people, culture and human race. Knowledge is shared through tools such as the intranet which is excellent. However, there are no formal social networking tools in place. People should definitely be rewarded in different ways and in the way which meets their individual needs which may not always be monetary.

- **Innovation**
  Innovation could be anything; at Nissan innovation is about products however culture contains innovation

- **Knowledge management and innovation**
  This is different in different culture, the relationship between knowledge management and innovation is about people, the greater the depth of common knowledge the more this will lead to innovation.

Industry Study: Questionnaires

Thank you participating in the questionnaire being conducted for MBDA by Cranfield University as part of an MSc project.
This questionnaire will only take a few minutes for you to complete. If you have any questions about this questionnaire or need assistance, please contact the sender.

- **Background**

  What organisation are do you work for? BAE Systems – The Systems Engineering Innovation Centre

  What is your role/job description? Business Development & Customer Manager

- **Knowledge Management and Innovation**

  In the context of your organisation or from your experience what does knowledge management mean?

Knowledge management within an organisation (in my simplistic view) relates to the organisation's ability to harness the information generated from within (and without) in a useful and efficient manner, thereby, delivering know-how to the resource within this organisation in the form of expertise, capability, process and best practice on time and in a format that is fit for purpose. In other words, knowledge management relates to how information is stored, processed and accessed as capability enhancing intelligence.

How would you rate knowledge management in your organisation? (Please ✔)

- ☐ Excellent
- ☑ Good
- ☐ Fair
- ☐ Poor

In the context of your organisation or from your experience what does innovation mean?

Innovation is critical to the success of ALL types of organisations and ventures – industrial, academic, governmental, service or product. Taken to mean the exploitation of ideas for a beneficial purpose, innovation enables organisations to attain an advantageous position (market-wise) with respect to competitors. In essence, innovation enables evolution, growth, redirection, sustainability and flexibility.

For the aerospace and defence industries, innovation is key to the delivery of complex (and evolving) systems over, extraordinarily, long lifecycles and product lifetimes. Through innovation, these industries are able to integrate new developments with legacy (sub)systems as well as respond to evolving requirements

How would you rate innovation in your organisation? (Please ✔)

- ☑ Excellent
- ☐ Good
- ☐ Fair
- ☐ Poor

How related are knowledge management and innovation in your organisation and how? (Please ✔)

- ☑ Extremely related

Innovation is intimately linked to knowledge management from two perspectives; (i) technical innovations in terms of IT, data storage, visualisation techniques, intelligent agents and similar algorithms and (ii) the structure of the knowledge – appropriateness and timeliness. The two are vital to enable maximum exploitation.

- ☐ Closely related
- ☐ Somewhat related
- ☐ Not related

➢ **Barriers to Innovation**

What are the top 3 barriers to innovation in your organisation? (Please ✔)

- ☑ Excessive bureaucracy
- ☐ Lack of innovation teams
- ☐ Lack of an organisational culture
- ☑ Poor knowledge management
- ☐ Insufficient resources
- ☑ Poor IT infrastructure
- ☐ Not having a formal procedure for submitting ideas
- ☐ Other (Please state)

- **Innovation Teams**

  Do you have innovation teams in your organisation? If so, how and why are they formed? (e.g. for
  specific challenges or projects) Please provide an example of this?

N/A

- **Further Comments**

  If there are any other comments or thought that you would like to share, please do so here:

Working Groups (WG) tend to be the main vehicle for sharing (technical) knowledge using the company-based IT infrastructure (Intranet). These WGs are formed on a "need to have" basis and tend to have definite lifetimes of existence. Other means of knowledge exchange/sharing within the organisation tend to be ad hoc or piecemeal; within departments, groups, business units etc. The mechanisms can vary from official (or not) reports (electronic and/or hard copy) or e-mail.
The company's intranet / website is a major source of information, particularly that relating to processes, guidelines, best practice as well as general news updates. This platform for knowledge sharing is particularly useful for common practices, style-guides, pro-forma, top-level statistics and publicity as well as for company rule and regulations.

End of Questionnaire……..Thank you for participating!

Thank you participating in the questionnaire being conducted for MBDA by Cranfield University as part of an MSc project.
This questionnaire will only take a few minutes for you to complete. If you have any questions about this questionnaire or need assistance, please contact the sender.

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1) Background

What organisation are do you work for? ___Pera Innovation Ltd_____

What is your role/job description? ___Key Knowledge Holder_____

2) Knowledge Management and Innovation

In the context of your organisation or from your experience what does knowledge management mean?

The collation and cataloguing of all knowledge held by the company, be that tacit or documented. Providing a simple interface to allow this knowledge to be accessed by any staff member at any time.

How would you rate knowledge management in your organisation? (Please ✔)

- ☐ Excellent
- ☐ Good
- ☐ Fair
- ☑ Poor

In the context of your organisation or from your experience what does innovation mean?

Innovation is the creation of new ideas that have market potential (i.e. can generate revenue)

How would you rate innovation in your organisation? (Please ✔)

- ☐ Excellent
- ☐ Good

☑ Fair

☐ Poor

How related are knowledge management and innovation in your organisation and how? (Please ✔)

☐ Extremely related

☐ Closely related

☐ Somewhat related

☑ Not related We show very little attempt to innovate and have no clear knowledge management

- **Barriers to Innovation**

What are the top 3 barriers to innovation in your organisation? (Please ✔)

☑ Excessive bureaucracy

☐ Lack of innovation teams

☑ Lack of an organisational culture

☐ Poor knowledge management

☐ Insufficient resources

☐ Poor IT infrastructure

☑ Not having a formal procedure for submitting ideas

☐ Other (Please state)

- **Innovation Teams**

Do you have innovation teams in your organisation? If so, how and why are they formed? (e.g. for specific challenges or projects) Please provide an example of this? N/A

- **Further Comments**

If there are any other comments or thought that you would like to share, please do so here: N/A

End of Questionnaire……..Thank you for participating!

Thank you participating in the questionnaire being conducted for MBDA by Cranfield University as part of an MSc project.
This questionnaire will only take a few minutes for you to complete. If you have any questions about this questionnaire or need assistance, please contact the sender.

- **Background**

What organisation are do you work for? ___PepsiCo International_____

What is your role/job description? __ R&D Director – Open Innovation & R&D Capability Building

- **Knowledge Management and Innovation**

In the context of your organisation or from your experience what does knowledge management mean?

- Controlling the internal management of protectable information (eg, specifications, patents etc).
- How to share this information within PepsiCo globally appropriately. Given that we work across many markets, there may be legal implications within this.
- Maintaining a database of historical information (eg launches), so the information is not lost as people retire or move on.

How would you rate knowledge management in your organisation? (Please ✔)

☐ Excellent

☐ Good

☐ Fair

☑ Poor

In the context of your organisation or from your experience what does innovation mean?

Innovation to me is about presenting something to a customer or consumer that either meets their known needs or exceeds an expectation. Innovation in PepsiCo is strongly linked to consumer insights, and a lot of time and money is spent working with focus groups or running consumer tests. As an example, we know that consumers always like to see new flavours, but in the same way that consumers didn't ask for the Post-It note or the fax machine, we also have to develop products that are ahead of their thought process. Innovation is often seen as product based, but it can also be around packaging format, marketing campaign or graphical design.

How would you rate innovation in your organisation? (Please ✔)

- ☐ Excellent
- ☑ Good

and improving strongly over the last few years.

- ☐ Fair
- ☐ Poor

How related are knowledge management and innovation in your organisation and how? (Please ✔)

- ☐ Extremely related
- ☐ Closely related
- ☑ Somewhat related

And about to improve as we bring in some new systems

- ☐ Not related

➢ **Barriers to Innovation**

What are the top 3 barriers to innovation in your organisation? (Please ✔)

- ☐ Excessive bureaucracy
- ☐ Lack of innovation teams
- ☐ Lack of an organisational culture
- ☐ Poor knowledge management
- ☑ Insufficient resources
- ☑ Poor IT infrastructure
- ☐ Not having a formal procedure for submitting ideas
- ☑ Other (Please state)

lots of ideas and active projects, but insufficient A&M (advertising and marketing) to support, or lack of space in the innovation calendar either for us or the trade. Ie, there are a finite number of launches that can be executed well each year.

- **Innovation Teams**

Do you have innovation teams in your organisation? If so, how and why are they formed? (e.g. for
specific challenges or projects) Please provide an example of this? Yes, we have specific innovation teams. They may either be formed for a project launch or to resolve a particular issue. Examples: a team will be formed for all product launches. A team might be formed to combat an issue such as finding a raw material replacement if one becomes unavailable or too expensive.

- **Further Comments**

If there are any other comments or thought that you would like to share, please do so here: N/A

End of Questionnaire……..Thank you for participating!

Thank you participating in the questionnaire being conducted for MBDA by Cranfield University as part of an MSc project.
This questionnaire will only take a few minutes for you to complete. If you have any questions about this questionnaire or need assistance, please contact the sender.

- **Background**

  What organisation are do you work for? Procter & Gamble_____

  What is your role/job description? Research Fellow (R&D scientist/product developer)_____

- **Knowledge Management and Innovation**

  In the context of your organisation or from your experience what does knowledge management mean? This is the system for collection and sharing of information & expertise that has relevance to the business.

How would you rate knowledge management in your organisation? (Please ✔)

- ☐ Excellent
- ☑ Good
- ☐ Fair
- ☐ Poor

In the context of your organisation or from your experience what does innovation mean? Innovation is the delivery of incremental or disruptive change that enhances the business. This can have several different forms including product, commercial, cost or process

How would you rate innovation in your organisation? (Please ✔)

- ☐ Excellent
- ☑ Good
- ☐ Fair
- ☐ Poor

How related are knowledge management and innovation in your organisation and how? (Please ✔)

☑ Extremely related

The key to innovation is connection. The key to connection is knowledge. Knowledge is enhanced through a "knowledge management" process

☐ Closely related

☐ Somewhat related

☐ Not related

- **Barriers to Innovation**

1. What are the top 3 barriers to innovation in your organisation? (Please ✔)

☑ Excessive bureaucracy

☐ Lack of innovation teams

☐ Lack of an organisational culture

☐ Poor knowledge management

☐ Insufficient resources

☐ Poor IT infrastructure

☑ Not having a formal procedure for submitting ideas

☑ Other (Please state)

Poor predictive research methods AND lack of support for "serial individual innovators"

- **Innovation Teams**

Do you have innovation teams in your organisation? If so, how and why are they formed? (e.g. for

specific challenges or projects) Please provide an example of this? If you mean a team that is charged with the task of developing new sustaining/disruptive innovation ideas so that an innovation pipeline is established, then the answer is yes. We have several systems in place to manage this upstream idea generation and idea development process.....Innovation is a team sport

- **Further Comments**

If there are any other comments or thought that you would like to share, please do so here: Watch out for the term “innovation team" might be defined differently in different organisations and you won't realise that from the responses.

End of Questionnaire……..Thank you for participating!

Thank you participating in the questionnaire being conducted for MBDA by Cranfield University as part of an MSc project.
This questionnaire will only take a few minutes for you to complete. If you have any questions about this questionnaire or need assistance, please contact the sender.

- **Background**

What organisation are do you work for?

____Cadbury_____

What is your role/job description? _____Open Innovation Champion_____

- **Knowledge Management and Innovation**

In the context of your organisation or from your experience what does knowledge management mean? The exchange of information/know how within our company across regional and business unit boundaries, as well as managing external information access (such as links to publications

How would you rate knowledge management in your organisation? (Please ✔)

☐ Excellent
☑ Good
☐ Fair
☐ Poor

In the context of your organisation or from your experience what does innovation mean? New science/materials/methods that can be applied to our products or process, leading to new products on the market or savings in manufacturing

How would you rate innovation in your organisation? (Please ✔)

☐ Excellent
☐ Good
☑ Fair
☐ Poor

How related are knowledge management and innovation in your organisation and how? (Please ✔)

☑ Extremely related

KM is seen as critical for our innovation activities - linking up scientists globally to share what they already know or brainstorm what is possible

☐ Closely related

☐ Somewhat related

☐ Not related

- **Barriers to Innovation**

What are the top 3 barriers to innovation in your organisation? (Please ✔)

☐ Excessive bureaucracy

☐ Lack of innovation teams

☐ Lack of an organisational culture

☐ Poor knowledge management

☑ Insufficient resources

☐ Poor IT infrastructure

☑ Not having a formal procedure for submitting ideas

☑ Other (Please state)

short term focus

- **Innovation Teams**

Do you have innovation teams in your organisation? If so, how and why are they formed? (e.g. for
specific challenges or projects) Please provide an example of this?
Yes. They are formed for specific projects and challenges. A small number are looking at long term science, most are aimed at new product development with the aim of producing new products for the short term

- **Further Comments**

If there are any other comments or thought that you would like to share, please do so here: N/A

End of Questionnaire……..Thank you for participating!

Thank you participating in the questionnaire being conducted for MBDA by Cranfield University as part of an MSc project.
This questionnaire will only take a few minutes for you to complete. If you have any questions about this questionnaire or need assistance, please contact the sender.

➢ Background

What organisation are do you work for? Nissan Technical Centre

What is your role/job description? Manager of Business Efficiency and Organisational Change

➢ Knowledge Management and Innovation

In the context of your organisation or from your experience what does knowledge management mean?

Knowledge management is about people, culture and human race

How would you rate knowledge management in your organisation? (Please ✔)

☐ Excellent

☑ Good

Tools could be used better to improve knowledge management

☐ Fair

☐ Poor

In the context of your organisation or from your experience what does innovation mean? Innovation could be anything; at Nissan innovation is about products however culture contains innovation

How would you rate innovation in your organisation? (Please ✔)

☐ Excellent

☑ Good

In some places this is excellent but people should be managed better

☐ Fair

☐ Poor

How related are knowledge management and innovation in your organisation and how? (Please ✔)

- ☐ Extremely related
- ☑ Closely related

At Nissan Japan

- ☐ Somewhat related
- ☐ Not related

➢ **Barriers to Innovation**

What are the top 3 barriers to innovation in your organisation? (Please ✔)

- ☐ Excessive bureaucracy
- ☐ Lack of innovation teams
- ☑ Lack of an organisational culture
- ☐ Poor knowledge management
- ☐ Insufficient resources
- ☐ Poor IT infrastructure
- ☐ Not having a formal procedure for submitting ideas
- ☑ Other (Please state)

Leadership is not used or infiltrated down into the organisation

➢ **Innovation Teams**

Do you have innovation teams in your organisation? If so, how and why are they formed? (e.g. for
specific challenges or projects) Please provide an example of this?
Yes in Japan, there is an entire Advanced Technical Centre which Takeuchi Nonaka advised about the layout of this building

➢ **Further Comments**

If there are any other comments or thought that you would like to share, please do so here: N/A

End of Questionnaire……..Thank you for participating!

Thank you participating in the questionnaire being conducted for MBDA by Cranfield University as part of an MSc project.
This questionnaire will only take a few minutes for you to complete. If you have any questions about this questionnaire or need assistance, please contact the sender.

- **Background**

  What organisation are do you work for? _____InnovationXchange

  What is your role/job description? __Business development

- **Knowledge Management and Innovation**

  In the context of your organisation or from your experience what does knowledge management mean?

KM is the basis of the business – the InnovationXchange has been established to help organisations access open innovation

How would you rate knowledge management in your organisation? (Please ✔)

- ☑ Excellent
- ☐ Good
- ☐ Fair
- ☐ Poor

In the context of your organisation or from your experience what does innovation mean?

Innovation is the commercial exploitation of ideas new to the company or sector

How would you rate innovation in your organisation? (Please ✔)

- ☑ Excellent
- ☐ Good
- ☐ Fair
- ☐ Poor

How related are knowledge management and innovation in your organisation and how? (Please ✔)

☑ Extremely related

Completely interconnected…

☐ Closely related

☐ Somewhat related

☐ Not related

➢ **Barriers to Innovation**

2. What are the top 3 barriers to innovation in your organisation? (Please ✔)

☐ Excessive bureaucracy

☐ Lack of innovation teams

☐ Lack of an organisational culture

☐ Poor knowledge management

☐ Insufficient resources

☐ Poor IT infrastructure

☐ Not having a formal procedure for submitting ideas

☑ Other (Please state)

The vision of the individual – ability to spend time thinking outside the box

➢ **Innovation Teams**

Do you have innovation teams in your organisation? If so, how and why are they formed? (e.g. for specific challenges or projects) Please provide an example of this?
Intermediaries are trained to be embedded in client organisation – the whole company is an innovation team

➢ **Further Comments**

If there are any other comments or thought that you would like to share, please do so here: There is no shortage of ideas either inside or outside most organisations – the problem is the ability of the internal organisation to accept and use these ideas

End of Questionnaire……..Thank you for participating!