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THE PROCESS OF CREATING DYNAMIC CAPABILITIES

BY

CYNTHIA ADORKOR AKWEI

Doctoral thesis submitted in partial fulfilment of the requirements for the award of PhD of Loughborough University

(2007)

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DEDICATION

To my parents and my son, Bismarck
ABSTRACT

The concept of dynamic capability (DC) is receiving significant attention from scholars in strategy and organisation research. However, most of the research is conceptual in nature. In this thesis, the process of how DCs are created in two firms is examined using the grounded theory methodology (GTM) with the aim of developing a substantive theory of DC creation. Data were collected using theoretical sampling, and unstructured and semi-structured interviews. These data were then analysed using the constant comparison method to identify and explain the process through which DCs are created. The findings from the study reveal that DCs are created through continuous internal activities such as in-house innovation, human resource activities (HRAs), and external activities with partners through collaboration and acquisitions. Firms learn from these activities, which lead to changes in the static organisational capabilities and the development of higher order capabilities, the DCs. From this study, a framework has been developed for considering and managing the process of creating DCs at a strategic level. The framework explains the reasons why these firms develop and renew their DCs, identifies the key resources required, and examines the activities through which DCs are developed and renewed. The framework is both iterative and simultaneous. Implications for academics and practitioners are discussed, and limitations and directions for future research are outlined.

Key words: Dynamic Capabilities, Resource Based View, Learning, Hybrid Strategy, Resources, Grounded Theory Method.
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GLOSSARY OF KEY TERMS AND CONCEPTS

**Capability** is the capacity for a set of resources to collectively perform a task or an activity. It can be zero-level or higher-level capability.

**Competitiveness** is a comparative concept of the ability and performance of firms to create more value in a given market than their competitors.

**Competences** are the activities and processes through which a firm deploys its resources effectively.

**Creation and development** in this study describe the evolution of existing dynamic capabilities rather than the creation from scratch of completely new dynamic capabilities.

**Dynamic capability** is the firm’s ability to create, develop, and modify its capabilities in order to achieve a better fit with its rapidly changing business environment.

**Functional level** refers to the primary activities undertaken by firms, such as product development, finance, marketing, human resources, project management and IT.

**Higher-level capability**, also known as dynamic, improvement, evolutionary and strategic capability, enables firms to accumulate and change capabilities to earn future rents. These capabilities are not easily imitated or obtained, and critically underpin competitiveness.

**Hybrid strategy** refers to the combination of planned and emergent strategies to develop DCs.

**Process** is a series of evolving actions that explains how a phenomenon occurs over time.

**Resource-Based View (RBV)** maintains that it is the firm’s bundle of unique resources that help the firm to sustain competitiveness by possessing and controlling resources that are rare, valuable, inimitable and non-substitutable.
**Resources** refers to the tangible and intangible factors such as stocks of knowledge, financial assets, physical assets, human capital, structural, and relationship, and any other factors that a business owns or controls that assists it to achieve its goals.

**Strategic Level** refers to the overall scope of a firm involving the different parts and encompassing the entire value chain of the firm.

**Zero-level capability**, also known as static organisational, functional, substantive, and operational, is the type of capability that firms employ for their day-to-day operations to enable them compete in their markets and earn present rents.
CHAPTER 1 INTRODUCTION

1.1 INTRODUCTION

This chapter presents a brief overview of the purpose and context of this study. It begins with a short discussion of the background and focus of the research, explains the current state of knowledge of the concept of dynamic capability and identifies the gap in the current research literature. This is followed by the presentation of the research question, aim and objectives, and the research process of the study. The chapter concludes with an outline of the subsequent chapters of the thesis.

1.2 BACKGROUND OF RESEARCH

"The thrust of strategy is about achieving and sustaining competitive advantage" (Teece et al., 1997: 509). The term competitive advantage can be defined as "anything that a firm does especially well, compared to rival firms" (David, 2004: 8). Therefore to be successful, firms have to achieve and sustain their competitiveness in their markets. "A firm is said to have a sustained competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors and when these other firms are unable to duplicate the benefits of this strategy" (Barney, 1991: 102). To be competitive, a firm must continually adapt to changes in the external environment in relation to its internal capabilities and resources, and effectively formulate, implement and evaluate strategies that capitalise upon these factors (David, 2004). One of the ways through which firms can achieve and sustain competitiveness is through the development of dynamic capabilities (DCs).

The concept of DC has gained rapid recognition as a potential source of achieving and sustaining competitiveness in firms (Teece et al., 1997; Eisenhardt and Martin, 2000; Rindova and Kotha, 2001; Zollo and Winter 2002; Leoncini et al., 2003; Keil, 2004; Ethiraj et al., 2005; Menguc and Auh, 2006; Zahra et al., 2006). DCs have the potential to achieve and sustain competitiveness. Unlike static organisational
capabilities¹, which are the abilities to solve a problem or achieve an outcome in organisations (e.g. new product development), DCs are the abilities to reform the static organisational capabilities (e.g. the ability of the firm to renew the ways they develop new products) (Zahra et al., 2006). Therefore, DCs assist firms to renew and develop static organisational capabilities and resources to adapt to changes in a rapidly changing environment to achieve and sustain competitiveness.

In the literature, the DC concept has been defined in many different ways. These definitions range from DCs as an ability to meet changes in the external environment (Teece and Pisano, 1994; Teece et al., 1997; Eisenhardt and Martin, 2000; Lee et al., 2002; Zahra and George, 2002), DCs as the ability to achieve superior performance (Griffith and Harvey, 2001; Zollo and Winter, 2002), DCs as processes (Eisenhardt and Martin, 2000), and DCs as the ability to create market change (Eisenhardt and Martin, 2000; Winter, 2003; Zahra et al., 2006). The examples below illustrate two of these definitions:

"The ability of firms to create competences and renew resources from within and outside the firm to adapt to the rapid changing business environment within which they operate" (Teece et al., 1997: 516).

"The firm's processes that use resources-specifically the processes to integrate, reconfigure, gain and release resources-to match or even create change. Dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resource configuration as markets emerge, collide, split, evolve and die" (Eisenhardt and Martin, 2000: 1107).

From these definitions, the DC concept is made up of two words: dynamic and capability. The dynamic aspect of the DC concept connotes change. The capability part refers to the capacity of the firm (the internal and external firm skills, resources, and functional competences of the firm) to produce or achieve a particular outcome. Thus, DC is the firm's ability to create, develop, and modify its capabilities in order to achieve a better fit with its changing business environment. These DCs are created because they cannot be bought from strategic markets and they are embedded in the firm (Teece et al., 1997; Makadok, 2001). They are also likely to be path-dependent

¹ Organisational capability is "a high level routine (or collection of routines) that together with its implementing input flows confers upon a firm's management a set of decision options for producing significant outputs" (Winter, 2000: 983).
and tacit in nature (Teece et al., 1997; Eisenhardt and Martin, 2000) and thus they resist imitation by rival firms which is important for sustaining competitiveness.

Although the DC concept has received attention as a significant source of competitiveness, the holistic process through which firms develop DCs to compete is lacking in empirical investigation (Williamson, 1999; Rouse and Dallenbach, 1999; Priem and Butler, 2001; Easterby-Smith et al., 2006; Peteraf, 2006). Since DCs assist firms to achieve and sustain their competitiveness in markets, it is important to establish a clear process for developing DCs.

1.3 RESEARCH PROBLEM

A comprehensive literature survey reveals a plethora of strategic management theories and frameworks (e.g. Industrial Organisational Model, Resource-Based View, and Game Theory) that attempt to explain how firms achieve and sustain competitiveness. However, these strategic management theories and frameworks have fallen short of helping scholars and researchers to understand the strategic level process through which firms develop DCs (Teece et al., 1997). Both the theoretical and empirical data on how DCs are created at the strategic level remain sketchy and a subject of debate within the strategy literature (Volberda, 2004). The few empirical studies on the process of creating DCs (Deeds et al., 2000; Katzy et al., 2001; Rindova and Kotha, 2001; Rindova and Taylor, 2002; Danneels, 2002; Zhu and Kraemer, 2002; Salvato, 2003; Ethiraj et al., 2005; Lazonick and Prencipe, 2005; George, 2005; Menguc and Auh, 2006) focus on the functional level (e.g. product development and innovation, IT strategy, and project management).

To understand the development of DCs at the strategic level involves a thorough identification and understanding of capabilities of the entire firm and not only of a single function within the firm. Firms engaging primarily in actions at the functional level alone are likely to find it difficult to implement strategic actions and to take advantage of opportunities emerging from daily activities at lower firm-levels and vice-versa (Miner, 1994; Feldman, 2000; McGrath, 2001). Hence, it is important that research focusing on the creation of DCs at the strategic level studies both strategic and functional factors.
Empirical studies to explain the strategic level process are still lacking. Volberda (2004: 39) notes that "most of the existing tools of the DCs' school of strategy are developed within the functional areas and focus on functional capabilities like manufacturing and supplier relationships. However, the more complex ones, which are more broadly based, encompassing the entire value chain are still sparse". Similarly, Marino (1996) notes that although many tools have been developed for identifying functional capabilities, frameworks for analysing the more complex capabilities at the strategic level are very few. Moreover, the few studies that describe the creation of DCs at the strategic level are largely conceptual (e.g. Teece et al., 1997; Eisenhardt and Martin, 2000; Zollo and Winter, 2002; Zott, 2002; Bowman and Ambrosini, 2003, Zahra et al., 2006). The applicability of these conceptual theories and frameworks in supplementing extensive empirical research into the process of creating DCs at the strategic level for firm performance has been questioned. Researchers such as Mosakowski and McKelvey (1997) Williamson (1999) and Priem and Butler (2001) have challenged the DC concept as tautological, endlessly recursive, and non-operational. They argue that the concept lacks empirical grounding and insights into the mechanisms through which firms achieve competitiveness in high velocity markets.

In the DC literature, there are many inconsistencies and terminology ambiguities. Theorists have used concepts such as resources, assets, competences, and capabilities in a rather liberal manner and sometimes different meanings are attached to the same concept by different theorists (e.g. Prahalad and Hamel, 1990; Barney, 1991; Kogut and Zanders, 1992). These terminological ambiguities partly stem from the fact that the DC concept is a far from coherent perspective (Peteraf, 2006). The inconsistencies in the DC literature is due to the lack of adequate empirical grounding of the holistic processes through which firms develop DCs and apply them to achieve and sustain competitiveness. This is the reason why the DC concept has been criticised as vague, tautological, and not grounded in practice; hence the plea for more research to enable theory to keep up with practice (Easterby-Smith, 2006).
1.4 RESEARCH QUESTION

According to (Strauss and Corbin, 1990: 52), "a good source of research questions in grounded theory studies is the 'technical literature' (i.e., reports of research studies and theoretical and philosophical papers characteristic of professional and disciplinary writing) on the general problem area". Hence, the general literature on DCs was read to identify the research problem (see sections 2.2.4 and 2.2.4.1). The limitations in the existing literature implied that there is lack of evidence of a coherent theory to explain the creation of DCs at the strategic level. The main research question of this study is therefore, how do firms develop strategic level DCs?

To gain insights into the process of creating DCs, it is necessary to understand how firms develop them. As an understanding of this emerges, it is then possible to identify the process behind how firms create DCs.

1.5 AIM AND OBJECTIVES OF RESEARCH

The aim of this study is to develop a theory of the process of creating DCs at the strategic level. This will involve the identification and explanation of the strategic level process through which DCs are created.

The following objectives were specified in order to get to the core of the process of creating DCs:

1. To identify factors that contribute to development of DCs

It is necessary to identify and understand the factors that contribute to the development of DCs at the strategic level. Although the researcher is required to enter the field with no preconceptions of what these factors may be, the literature

---

2 In GTM, the researcher is required to enter the field with no preconceptions of the specific objectives of what to study on a phenomenon so that they then arise organically from the data (for further information, refer to Chapter 3). These objectives were derived during data collection and analysis; however, they have been stated here to make it easier for the reader to understand what the researcher is trying to accomplish.
however suggests a great number of factors that may well be involved in affecting
the process under investigation but, as noted in Chapter 2, the majority of these
factors have been identified in functional level research. Hence, we know little of the
factors involved at the strategic level.

2. **To determine resources required for developing DCs**

The concept of DC is rooted in the resource-based view of the firm. Consequently,
for firms to develop DCs, it is implied that resources will be a necessity. Once again,
however, scholars have little knowledge of the precise resources involved in this
process, in particular at the strategic level, and in turn, managers lack practical
advice as to the most appropriate resource-base for developing DCs in their firms.

3. **To describe the actual strategies and activities employed to create DCs**

Some initial readings of the literature suggest that firms may have strategies for
creating DCs. However, what we have little knowledge of in this literature field is
what the actual strategies are, how they are actually developed, and what actions
then form part of these strategies.

These objectives are therefore important in identifying how DCs are created at the
strategic level.

1.6 **RESEARCH PROCESS**

Figure 1-1 presents a diagrammatical overview of the entire research process of this
study, which illustrates the various stages and actions undertaken to achieve its aim.
It begins with the set-up of the study, which consists of the introduction of the
research problem and research question. This involved a preliminary literature
review of the IO, RBV strategic theories, and the DC concept. The literature
reviewed at this stage of the research focuses on the broad areas of the DC concept,
not on specific attributes of DCs and the process of creating them. The next stages
of the study are the selection of the research philosophy, strategy, and tools for data
collection. The process of creating DCs is researched using a qualitative research
strategy, a constructivist philosophy and the GTM. Data were collected from two sites: Rolls Royce and Sage plc.

**Figure 1-1  Overview of Research process**

Unstructured and semi-structured interviews were employed as the main tools for data collection, supported by documentary evidence (annual/quarterly/project reports) and e-mails. A total of 27 interviews were conducted. The participants for the interview were directors, senior managers, and middle managers. They were selected for the study using theoretical sampling, which is based on their theoretical relevance for furthering the development of the theory (Glaser and Strauss, 1967).

The data were analysed using the constant comparative method (Glaser and Strauss, 1967) and theoretical comparisons (Strauss and Corbin, 1998) of joint coding and analysis of qualitative data, during which objectives of the study were delineated. About 70% of the concepts and categories developed for the theory were in vivo codes, abstracted from the language of the interviewees, and the remainder were labels placed on categories by the researcher, based on the explanations provided by
the interviewees. During data analysis, literature on the process of creating DCs was reviewed based on the emerging concepts and data were frequently compared to literature to synthesise the emerging theory.

The final stages of the research were to derive the findings and conclusions of the study. The findings highlight that developing DCs involves both internal and external development approaches that are both planned and emergent, and these approaches rely on several key resources and activities. The participating firms use activities such as continuous in-house innovation, HRAs, collaboration with partners, and acquisitions of other firms. The firms then learn from these activities through codification, articulation and utilisation, and apply these skills to develop and renew their DCs. The findings show how the strategies, key resources and activities interact to develop DCs.

1.7 THESIS OUTLINE

This thesis is divided into eight chapters, and Figure 1-2 shows its structure.
After this Chapter introduces and provides a brief overview of the entire research project in this chapter, Chapter 2 reviews the literature and extant research on the process of creating DCs. The first part of the chapter examines the frameworks of strategy: the industrial organisation model (IO) and RBV and the DC concept, which explain how strategy is developed to achieve competitiveness. This involves an analysis of the basic assumptions, components and limitations of both IO and RBV frameworks and how these limitations paved the way for the development of the DC concept. A presentation of the DC concept then focuses on its definition, origin, difference between other capabilities and DCs, features, limitations, and a review of literature on the process of creating DCs to develop the research question. The second part of the chapter then presents literature on the process reviewed during data collection and analysis, with a focus on the similarities and differences between the developed theory and extant literature on the process of creating DCs at the strategic level.

Chapter 3 presents the research design. The first part of the chapter presents the philosophy and research of the study, the interpretive philosophy, specifically the constructionist/constructivist philosophy for the interpretation of data. The second part of the chapter then discusses the qualitative research strategy adopted, and considers the major concerns of qualitative methods for the discovery of theory, the different types of qualitative methods, and why the GTM was selected for the research. Further, it discusses how to achieve the research objectives through the use of GTM. The chapter discusses in detail the discovery, nature and type of GTM used, the differences between GTM and other qualitative methods, the type of theory generated, how theory is generated from the GTM approach, and the basic tenets of the GTM.

Chapter 4 describes the data collection procedure of the study. It introduces and explains the sources and tools adopted for the collection and management of data. Discussion follows on the different types of interviews and the rationale for the selection of the unstructured/semi-structured interview as the appropriate tools for collecting data, supported by secondary data. Next, there is a discussion of the data management system adopted for the study. It explains why the computer-assisted qualitative data analysis software (CAQDAS) was used to aid analysis, the selection...
of NVivo2.0 as the appropriate software for the research, and the benefits and limitations of using CAQDAS.

Chapter 5 describes how the data collected were analysed. It explains the various analytical processes used for data abstraction and interpretation. The chapter begins with a discussion of the very basic stage of the analysis process, open coding, and followed by a discussion of the abstract and more theoretical stages: axial and selective coding. Finally, the chapter presents an illustration of how the data were analysed through open, axial and selective coding, examples of abstractions, concept and category development, written memos, and diagrams depicting the development of the substantive theory. The chapter concludes by considering how the issues of validity and reliability were addressed within the research.

Chapter 6 presents the findings of the research. It begins with the findings of the substantive theory developed from data from the two participating firms. The findings are then discussed using the model, with an extensive theoretical discourse supported by illustrations from the interview data. It explains the components of the theory: the reasons why firms develop DCs, the key resources required for developing DCs, the development approaches, strategies adopted, the main activities, and learning as an intervening mechanism for creating DCs.

Chapter 7 discusses the substantive theory of the process of creating DCs. It presents how two DCs are created using the model, followed by a discussion of the theory in extant literature. It focuses on the similarities and differences of the theory developed in the literature, and how the theory contributes to knowledge of the process of creating DCs in the DC literature.

Chapter 8 presents the conclusions and implications of the research. It summarises all the information collected and formulated during the entire research, with particular reference to the findings from the two participating firms, Rolls Royce and Sage. It presents the contributions of the research and its implications for academics and practitioners. The final part of the chapter discusses the limitations of the study and identifies areas for future research.
1.8 SUMMARY

This chapter provided an introduction to the research, focusing on the research background, justification for the study, research question, aim and objectives, research process, and an outline of the thesis. The current knowledge of DCs suggests that the DC concept is still at its infancy stages (Newbert, 2007), without adequate empirical evidence on the process of creating DCs at the strategic level to support the assertion that DCs are potential sources of sustaining competitiveness in firms. Hence it is important to fill this gap in the DC research literature.
CHAPTER 2 LITERATURE REVIEW

2.1 INTRODUCTION

The aim of this chapter is to examine the theories and relevant literature for this study. The first part of the chapter presents an overview, analysis and critique of the three dominant theories in the strategic management literature to explain how firms can achieve and sustain competitiveness: the Industrial Organisation Model, Resource-Based View and the DCs, and a literature review on the process of creating DCs to identify the research question. The second part of the chapter presents a literature review conducted during the analysis of the study data. Literature on the process of creating DCs at the strategic level was reviewed, with particular attention to details of how the literature is similar or different from the analysed data on the process of creating DCs.

2.2 THEORIES OF STRATEGY

This section of the chapter focuses on the theories underpinning this research. The first theory is the Industrial Organisation (IO) theory (Mason, 1949; Schumpeter, 1950; Bain, 1956, 1968; Stigler, 1968; Williamson, 1975; Porter, 1980), which emphasises the attainment of a dominant position in an industry to achieve competitiveness. The second theory is the Resource-Based View, which focuses on a firm’s specific resources to achieve competitiveness, and the third theory, the DC concept, which explains how firms in dynamic markets achieve competitiveness.

2.2.1 Industrial Organisation Model

The industrial organisation model is rooted in the structure-conduct-performance paradigm (SCP) (Mason, 1949; Bain, 1956, 1968; Porter, 1980). The SCP states that firm performance depends on its conduct in such matters as pricing policy, research and development, and investment policy. Firm conduct, in turn, depends on structural industry characteristics such as concentration, barriers to entry, and industry growth. The IO model maintains that the objective characteristics of
industries affect both the conduct (i.e. strategy) of firms, and their performance (Mason, 1949; Caloghirou et al., 2004). The IO framework therefore maintains that because firm conduct is constrained by industry structural forces, it does not represent independent managerial action. The main determinant of profitability and performance in this model is the structure of the industry in which a firm operates. The industry structure influences the strategic paths available to firms operating in this environment as well as the competitive rules of the business game (Teece et al., 1997).

The most dominant framework within the IO literature is Porter’s ‘five forces’ framework of competition. According to Porter (1980), firms can achieve and sustain competitiveness by identifying and neutralising all external environmental threats in the industry. He explains how firms could take action to defend themselves against the competitive forces to achieve and sustain competitiveness. His five competitive forces (entry barriers, threat of substitution, bargaining power of buyers, bargaining power of suppliers, and rivalry among industry incumbents) provides a systematic framework through which firms can create a market position and defend themselves against competition. According to him, a firm can achieve competitiveness by belonging to an attractive industry with a favourable competitive structure.

An analysis of the literature reveals that the IO model thrives on the following basic assumptions:

- Economic rents are monopoly rents (profits) for firms operating in this market. Firms can only make profits if they are able to obstruct the competitive forces (in either factor markets or product markets) which tend to drive their economic returns to zero (Mazzucato, 2002). For example, in Porter’s (1980) competitive forces framework, competitive strategies are aimed at altering the firm’s position vis-à-vis competitors and suppliers.

- Industry structure (e.g. how easy it is for new firms to enter) plays an important role in determining the strategies that firms in these markets can adopt and their performance (Mazzucato, 2002).

- Some industries are more attractive than others because they possess certain structural impediments to competitiveness that offer them better
opportunities for developing and sustaining their own competitiveness (Porter, 1980; Teece et al., 1997).

- Profits are largely created at the industry level or sub-sector level rather than the firm level (Teece et al., 1997).

2.2.1.1 Limitations of IO

The IO model maintains that the industry is more important than the firm in achieving competitiveness (Schmalanese, 1985). This assertion has been criticised by scholars such as Wernefelt (1989), Rumelt (1991) and Caloghirou et al. (2004). The reason for this is that it has been identified that firm-specific factors account more for a firm’s performance than the industry level effects. Rumelt (1991) argues that the firm-specific factors are more important than the industry-specific factors. Rumelt’s (1991) findings show that firm level effects explained variance in the firm’s performance rather than the industry level. Table 2-1 below shows percentage of business units’ profitability explained by industry and strategy factors.

Table 2-1 Importance of Choice of Industry and Strategy on Firm-Specific Factors

<table>
<thead>
<tr>
<th>Choice of Industry and Strategy</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choice of industry</td>
<td>8.3%</td>
</tr>
<tr>
<td>Choice of strategy</td>
<td>46.4%</td>
</tr>
<tr>
<td>Parent company</td>
<td>0.8%</td>
</tr>
<tr>
<td>Not explained – random</td>
<td>44.5%</td>
</tr>
</tbody>
</table>

Source: Rumelt (1991)

In Table 2-1, the choice of strategy is seen as more important in determining the performance of a firm (46.4%) than the choice of industry (8.3%). Caloghirou et al. (2004) in their study of SMEs identified that firm-specifics have 2.5-3 times the influence on firm performance than industry structures. They found that the impact of firm-specific capabilities, that is firm and managerial processes (coordination, learning, transformation), and the firm-specific assets (marketing, production, technology, financial), on profitability is more significant than that of the industry structure (concentration, product differentiation, industry growth). For example, Caloghirou et al. (2004: 238) posited that “DCs accounted for 14.6% and 48.2% of profitability in SMEs and large-sized firms respectively compared with 6% and
16.3% for the industry structure”. Based on the above analysis, it can be concluded that although the industry structure is important, the firm-specific capabilities are more important than the industry in determining performance.

Therefore, the IO model’s failure to realise that firm-specific factors account for more profitability than industry structures makes the IO a static model that cannot thrive in markets that are changing rapidly. These limitations in the IO model set the pace for another theory of strategy to explain how firms achieve competitiveness in markets. This led to firms’ increasing focus on their internal resources and capabilities to perform, achieve and sustain competitiveness, hence the theory of RBV to explain strategy.

2.2.2 Resource-Based View

The second approach to strategy is the Resource-Based View (RBV) which focuses on rents (profits) accruing to owners of scarce firm-specific resources and capabilities rather than the economic profits accruing from product-market positioning (Teece et al., 1997). The RBV, unlike the IO model, emphasises not only the industry environment in terms of future profitability but also the importance of managerial discretion and innovation (Amit and Schoemaker, 1993). Further, it explains how firm profitability accrues from the acquisition and control of valuable heterogeneous resources.

According to the RBV, firms which possess heterogeneous resources and capabilities are endowed with unique and idiosyncratic abilities to accumulate, develop and deploy those assets to formulate and implement value creating strategies (Barney, 1991; Peteraf, 1993). The RBV therefore relies on the efficiency of resources and competences for firm performance as opposed to the IO, which relies on market position to achieve competitiveness.

The RBV framework dates back to scholars such as Chamberlain (1933) who stated that unique assets and capabilities (patents and trademarks, technical know-how) are important factors giving rise to perfect competition and supernormal profits. Penrose’s (1959) arguments on the theory of the firm also shed light on the RBV. Penrose (1959: 24) stated that “the firm is more than an administrative unit; it is a
collection of productive resources, the disposal of which, between different users, and over time, is determined by administrative decisions”. Penrose (1959) maintains that it is the heterogeneity of the productive services available or potentially available from the firm resources that gives the firm its unique character. This argument by Penrose (1959) is the basis of the RBV heterogeneity of resources. Chamberlain (1933) and Penrose (1959) identified the importance of distinctive skills to firm performance; however, these ideas were not well developed until the mid-1980s and 1990s when the RBV was developed by Wernerfelt, (1984), Barney (1986; 1991), Prahalad and Hamel (1990), Rumelt (1991), Peteraf (1993), and Teece et al. (1997).

Wernerfelt (1984) defines the firm’s resources as tangible and intangible assets, which are tied semi-permanently to the firm. Wernerfelt (1984) examines the relationship between resources and profitability in terms of resource position barriers. His article paved the way for researchers to build on the RBV. Barney (1991) presents a more refined and detailed perspective. He argues that firms achieve competitive advantage by “implementing strategies that exploit their internal strengths through responding to the environmental opportunities while neutralizing the external threats and avoiding internal weaknesses” (Barney, 1991: 99).

The RBV assumes that it is the firm’s bundle of unique resources that helps the firm to sustain competitiveness by possessing and controlling resources that are valuable, rare, inimitable and non-substitutable, the so-called VRIN factors (Barney, 1991). Resources are the core of the RBV theory. The RBV emphasises the firm’s specific resources and assets, which should be heterogeneous, inimitable and immobile to ensure the sustainability of competitiveness. According to Barney (1991), resources must pass the VRIN conditions to ensure their sustainability to achieve competitive advantage. The four VRIN conditions are explained as follows:

- **Valuable resources**

  A firm’s resources are seen as a source of sustained competitive advantage when they are valuable. Barney (1991) argues that resources are valuable when they enable a firm to conceive or implement strategies that improve its efficiency and
effectiveness. Therefore, a firm’s resources should add value to enable the firm to exploit opportunities and neutralise threats.

- **Rare resources**

In the RBV framework, a firm enjoys competitive advantage when it is implementing a value-creating strategy not simultaneously implemented by a large number of competitors. This is due to the fact that if a particular valuable resource is possessed by a large number of competitors, then each has the capability to exploit that resource in the same way. Thereby, all will be implementing a common strategy that gives none of the firms a competitive advantage (Barney, 1991).

- **Inimitable resources**

For a resource to be a source of sustained competitive advantage for firms, the resource should not be imitable. In other words, if other firms understand the link between the firm’s resources and its advantages, they can learn about that link, acquire the necessary resources, and implement the relevant strategies. In such a setting, a firm’s competitive advantages are not sustained because they can be duplicated. On the other hand, when a firm with a competitive advantage does not understand the source of its competitive advantage any better than firms without it, that competitive advantage may be sustained because it is not subject to imitation (Barney, 1991).

- **Non-substitutability**

In the RBV framework, for a firm’s resource to be a source of sustained competitive advantage there should not exist any equivalent valuable resources that are themselves either rare or inimitable. Two valuable firm resources (or two bundles of firm resources) are strategically equivalent when each can be exploited separately to implement the same strategies (Barney, 1991). Substitutability can take at least two forms. First, though it may not be possible for a firm to imitate another firm’s resources exactly, it may be able to create a substitute, a similar resource that enables it to conceive and implement the same strategies. Secondly, very different firm resources can also be strategic
substitutes with regard to their formal planning systems, which can be strategically equivalent and hence may not help to sustain competitive advantage (Barney, 1991).

The RBV, therefore, is an influential theoretical framework which explains how competitive advantage within firms is achieved and how that advantage may be sustained over time (Eisenhardt and Martin, 2000).

2.2.2.1 Limitations of RBV

Although the RBV is an influential framework for explaining firm performance, it has been criticised for its lack of operational practicality in managerial settings (Sallinen, 2001). The RBV framework underplays the difficulty for management to predict the length of current advantage and the sources of future advantage. It assumes that firm growth is a result of selective resources’ accumulation and deployment, strategic factors, and factor markets’ imperfections (Oliver, 1997). In order to achieve firm growth, the RBV maintains that managers should only nurture idiosyncratic, valuable, rare, inimitable, and non-substitutable resources. These RBV assumptions therefore suggest that managers in search of firm growth have to (1) identify and classify the firm’s resources, (2) compare how valuable these resources are relative to the competitors’ resources and weaknesses, (3) assess the rent-generating potential of these resources and capabilities, and (4) select a strategy that best exploits the firm’s resources and capabilities relative to external opportunities (Grant, 1991; Teece et al., 1997). This process looks very simple, but it can be quite difficult to follow in managerial practice. This is because the level of the value that each resource produces can be difficult to determine, as this is external to the firm. Further, resources that are a source of distinctive advantage are typically socially complex phenomena, such as firm culture (Barney, 1986). Hence, the possibilities of a manager to influence these kinds of resources are limited.

The RBV also lacks certain context-specific adaptability. For example, the RBV cannot adequately explain how resources can be created to compete in dynamic markets. The RBV basic assumptions on which competitive advantage is sustained cannot thrive in dynamic markets where short-term unpredictable advantages are the norm (Brown and Eisenhardt, 1998). For example, in highly dynamic markets such
as technology and telecommunications, where products and services change at short intervals, static resources alone cannot help sustain competitive advantage (Galunic and Rodan, 1998). It is important that firms in dynamic markets develop timely responsiveness, rapid and flexible product innovation, and effective management capabilities to compete successfully in this market (Teece et al., 1997).

Further, the RBV is a static theory for a firm’s development in dynamic markets. This is because, from the RBV perspective, firms are heterogeneous in terms of their resources and capabilities (Barney, 1991). According to Teece et al. (1997: 514), “Resource endowments are ‘sticky’: at least in the short run, firms are to some degree stuck with what they have and may live with what they lack”. This ‘stickiness’ of resources arises because (1) firms find the capability development a complex process because they lack the capacity to develop capabilities quickly to adapt to the changing dynamic environment within which they operate (Dierickx and Cool, 1989); (2) some assets such as tacit know-how, reputation and relational assets (intangible assets that enable firms to achieve various goals in the market) are not easily tradable; and (3) even if they can be purchased in strategic factor markets, the cost of acquiring these assets draws on the profits made (Zander and Kogut, 1995; Teece et al., 1997).

Although there is a significant body of research on RBV, researchers have criticised it as conceptually vague and tautological (Porter, 1991; Williamson, 1991; Mosakowski and McKelvey, 1997; Eisenhardt and Martin, 2000; Priem and Butler, 2001; Bromiley and Fleming, 2002). According to Mosakowski and McKelvey (1997: 66) “The current state of the strategic management work on the resource-based view represents tautological reasoning of the sort that (1) rents are often used to define a firm's critical resources in that these resources are identified by comparing successful versus unsuccessful firms; and then (2) the question is asked whether these critical resources generate rents, to which a resounding YES is heard. They argue that a valid empirical measure of firm capabilities must be independent of whether or not it produces economic rent”. Again, as argued by Porter (1994: 445), “At its worst, the resource-based view is circular. Successful firms are successful because they have unique resources. They should nurture these resources to be successful. But what is a unique resource? What makes it valuable?" The RBV
proposes that owning and controlling valuable, rare, inimitable and non-substitutable resources leads to sustaining competitive advantage (Barney, 1991).

According Newbert (2007: 136), “Authors argue convincingly on theoretical grounds that resources, capabilities, and core competences under examination are valuable, rare, inimitable and/or non-substitutable, the empirical results seem to suggest that while capabilities and core competences do indeed contribute significantly to a firm’s competitive advantage, resources do not”. Simply owning and controlling unique resources does not make a firm successful or achieve competitive advantage. It is rather the capabilities and core competences created that assist firms to achieve competitive advantage.

The RBV, therefore, does not adequately explain how and why certain firms are competitive in situations of rapid and unpredictable change (Eisenhardt and Martin, 2000; Foss and Robertson, 2000; Priem and Butler, 2001, Sallinen, 2001). The RBV has been very efficient in stable markets, since in those markets, the industry structures are relatively stable, market boundaries are clear, and players are well known. However, when “markets are dynamic or in high velocity markets, where industry structures are not stable, market boundaries are blurred, successful business models are unclear and market players are ambiguous and shifting, the RBV cannot thrive and its leverage tends to collapse” (Eisenhardt and Martin, 2000: 1110). Hence, firms using RBV cannot operate successfully in such markets.

Although the RBV is far from a coherent theory (Peteraf, 2006), nevertheless it provides relevant points for this study. First, the RBV concept acknowledges that the firm’s ability to create and use resources better than its competitors is its important source of competitive advantage. The RBV also distinguishes between different types of resources and acknowledges the fact that these resources, tangible as well as intangible, vary in their level of complexity for developing certain types of capabilities. The model also paved the way for the theory of DCs to explain how firms renew their capabilities in a highly changing market environment.

Hence, the inability of the RBV to explain adequately how capabilities can be created to compete in dynamic markets led to the development of the DC concept. The DC concept, therefore, is an integrative approach which explains why and how
firms achieve and sustain competitiveness in highly-changing market environments. The next section examines the DC concept.

### 2.2.3 Dynamic Capability (DC) Concept

In dynamic markets, there is the need to develop a strategy that can change to meet the changing technological and managerial aspects in dynamic market environments. To explain how firms adapt to the changing environment within which they operate the DC concept was developed from the RBV. Figure 2-1 below traces its origins.

**Figure 2-1 Origin of DC Concept**
Figure 2-1 shows that the origin of the DC concept dates back to the 1930s and was formally developed by Teece et al. (1997). The basic theory related to the development of the DC concept is evolutionary theory (Schumpeter, 1934; Nelson and Winter, 1982), which focuses on how firms change over time. Evolutionary economists claim that firms are heterogeneous and have distinctive ways of doing things that show strong elements of continuity. Hence, firms build their capabilities in an institutional and policy context where capabilities themselves show slow patterns of change. Agyris and Schon (1978) also identified that organisations build capabilities which are tacit, through organisational learning. The product development literature (Clark and Fujimoto, 1991) also explained how firms develop difficult to imitate capabilities through innovation of new products. Further, the RBV literature (Wernerfelt; 1984; Barney, 1991) explains how firms develop capabilities through the possession of resources which are valuable, rare, inimitable and non-substitutable which enables them to perform better than others.

However, a theory that explains how firms develop and renew their capabilities to perform in dynamic environments was lacking, which led to the development of the DC concept by Teece et al. (1997). Their conceptual theory of the DC concept explains how firms develop and renew their resources to compete in dynamic markets. This was followed by further developments by Teece and Pisano (1998) and Teece (2003). The original Teece et al. (1997) theory was expanded by Eisenhardt and Martin (2000) to reflect the processes and the commonalities associated with the DC concept. Since then, there have been further extensions of the DC concept which are either conceptual or functional.

level strategy. Helfat and Peteraf (2003) studied the lifecycles of the DC concept, and Zahra et al. (2006) developed a conceptual model of how DCs are developed in entrepreneurship (see sections 2.2.4 and 2.3 for a detailed analysis of these studies).

### 2.2.3.1 Capabilities and DCs

To understand the DC concept it is important to understand the term capabilities. In the strategy literature, capabilities refer to the deployment and coordination of resources (Amit and Schoemaker, 1993; Grant, 1996). According to Amit and Schoemaker (1993: 359) capabilities “refer to a firm’s capacity to deploy resources, usually in combination, using firm processes, to effect a desired end”. Similarly, Day (1994: 38) describes capabilities as “complex bundles of skills and accumulated knowledge, exercised through firm processes that enable firms to coordinate activities and make use of their assets”. Therefore capability is the capacity for a set of resources to collectively perform a task or an activity.

Makadok (2001: 389) also defined capability as “a special type of resource-specifically, an organisationally embedded non transferable firm-specific resource whose purpose is to improve the productivity of other resources possessed by the firm”. This confirms the Teece et al. (1997) argument that capabilities cannot be easily bought; they must be built. Makadok’s (2001) definition distinguishes capabilities from other resources. The first distinguishing feature is that capabilities are firm-specific because they are embedded in the firm and its processes. Hence, due to their embedded ownership, capabilities cannot be transferred easily without transferring the subunits or acquiring the firm itself (Teece et al., 1997). The second distinguishing feature shows that the primary function of capabilities is to enhance the productivity of other resources that the firm possesses (Makadok, 2001).

Capabilities can be classified as rent-earning capabilities (static organisational capabilities) and capabilities that enable developing future rent-earning capabilities (DCs) (Day, 1994; Cockburn et al., 2000; Fujimoto, 2000; Jantunen, 2002; Helfat and Peteraf, 2003; Zahra et al., 2006). Table 2-2 distinguishes between the types of rent earning and future rent earning capabilities. For example, Fujimoto (2000: 339) identified three levels of capabilities: ‘static, improvement and evolutionary capabilities’. Static organisational capability refers to a firm’s operational level
capacity which is static in its basic nature. Static organisational capabilities are synonymous with functional (Marino, 1996), operational and substantive capabilities.

Table 2-2 Different Types of Capabilities

<table>
<thead>
<tr>
<th>Zero-level: Rent-earning capabilities</th>
<th>Higher-level: Future rent-earning capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static organisational capabilities (Fujimoto, 2000; Winter, 2000)</td>
<td>Dynamic capabilities (Teece et al., 1997; Zahra et al., 2006; Helfat et al. 2007)</td>
</tr>
<tr>
<td>Functional capabilities (Marino, 1996)</td>
<td>Improvement and evolutionary capabilities (Fujimoto, 2000)</td>
</tr>
<tr>
<td>Substantive capabilities (Zahra et al., 2006)</td>
<td>Strategic capabilities (Marino, 1996)</td>
</tr>
<tr>
<td>Operational capabilities (Helfat et al., 2007)</td>
<td></td>
</tr>
</tbody>
</table>

Functional, operational, and substantive capabilities are a set of things that the firm can do (skills) which are used for the day-to-day operations of the firm (Marino, 1996; Zahra et al., 2006; Helfat et al., 2007). According to Winter (2000: 983), a static organisational capability is “a high level routine (or collection of routines) that together with its implementing input flows confers upon a firm’s management a set of decision options for producing significant outputs”. Static organisational capability therefore involves activities such as product development and R&D capabilities, which enable firms to develop solutions and products. In a firm, capabilities may found on the shop floor, in R&D operations, and in managerial activities.

Improvement capability, in contrast, deals with the pace of performance improvements and thus causes changes in competitive performance. Comparatively, improvement capability is a more dynamic than static capability. Evolutionary capability enables the accumulation and change of capabilities themselves, and it is a highly dynamic capability that cannot be easily identified as a firm routine with a repetitive nature (Fujimoto, 2000). Out of the three capabilities identified, improvement and evolutionary capabilities are connected with firm change and the dynamics of new capability development. These capabilities are therefore complex, difficult to understand, identify and codify, hence their imitation is very difficult.
Improvement and evolutionary capabilities are therefore synonymous with dynamic capabilities (Teece et al., 1997) and strategic capabilities (Marino, 1996).

It is important to explain what routines are in relation to capability development in this study. Routines are seen as units of firm activity with a repetitive character and building blocks of firm capabilities (Cohen and Bacdayan, 1994). Grant (1991: 122) portrays firm routines as "regular and predictable patterns of activity which are made up of a sequence of coordinated actions by individuals". Cohen et al. (1996) define a routine as an executable activity for repeated performance in some context that has been learned by a firm in response to selective pressures. The context of routines in firms seems to operate from the firm-level to smaller sub-groups and individuals (Galunic and Rodan, 1998). Nelson and Winter (1982) identified three types of routines: short-run, investment and modification routines. Short-run routines determine the firm’s operating characteristics. Investment routines determine the augmentation or diminution of the firm’s capital stock. Modification routines modify various aspects of the firm’s operating characteristics over time.

The capability concept has been used in strategic management as an umbrella term (Jantunen, 2002). Different authors have used various terminologies such as competence and capabilities with different meanings, and this has resulted in many inconsistencies in the capability literature which has made the DC concept quite unclear (Foss and Mahnke, 2000; Winter, 2003). There are also other terminologies used to describe phenomena that are similar to DCs, such as combinative capabilities (Kogut and Zander, 1992), architectural competence (Henderson and Cockburn, 1994), and competences (Christensen, 2000).

Kogut and Zander (1992) use the term combinative capabilities to denote a firm’s ability to generate new applications from existing knowledge and recombine knowledge through internal and external learning. Kogut and Zander (1992: 384) define combinative capability as the ability "to synthesize and apply current and acquired knowledge". A firm can achieve economic gain from the ability to exploit knowledge in a situation of technological opportunity. Combinative resources therefore consist of a set of resources that are difficult to imitate. Kogut and Zander (1992) proposed three elements of combinative capabilities: how good a firm is presently at doing something, the ability of a firm to learn specific capabilities, and
the value of capabilities as platforms into new markets. According to them, how good a firm is relates to the firm’s ability to learn specific capabilities and the value of these capabilities in new markets. They emphasised the balancing between short-term and long-term development of capabilities.

In a similar vein, Henderson and Cockburn (1994) referred to architectural competence as the ability to access and integrate new knowledge into a firm. Henderson and Cockburn (1994) categorised a firm’s capability to transform its resources into two: component capabilities and integrative capabilities. Component capabilities are local abilities that are fundamental for day-to-day problem solving (Henderson and Cockburn, 1994: 65). These are the experience, the knowledge and skills embedded within firm routines, and they are regular patterns of activity of the firm (Winter, 2003). In contrast, integrative capabilities refer to the ability of a firm to use resources and component capabilities to support firm development and renewal. Integrative capabilities therefore emphasise the ability to deploy both resources and component capabilities in new or flexible ways to support organisational renewal (Henderson and Cockburn, 1994).

Also, Christensen and Overdorf (2000) posit that the ability to manage firms through disruptive changes is a dynamic capability. They maintain that it is important to manage firms through periods of disruptive changes because their existing capabilities are nullified through such changes. Christensen and Overdorf (2000) propose that in responding to a trigger of disruptive change, managers must create new capabilities, which are not as flexible or adaptable as resources. The new capabilities can be created through a new firm structure or acquiring the processes and values from a different firm that match the requirements of the firm.

2.2.3.2 What is a dynamic capability?

The DC concept has been defined in various forms in the literature. Table 2-3 presents some of the different definitions. These definitions place emphasis on two main areas: ‘dynamic’ and ‘capabilities’.

In these definitions, the term ‘dynamic’ refers to changes in capabilities so as to achieve congruence with the changing business environment. Certain innovative
responses are required when time-to-market and timing are critical, the rate of technological change is rapid, and the nature of future competition and markets is difficult to determine. Within the DC concept, ‘capabilities’ refers to routines, norms, values or learning ability that come into existence when individuals or firms possess tacit knowledge (Leonard-Barton, 1992; Zander and Kogut, 1995; Collis, 1996; Teece et al., 1997). The ‘capabilities’ component of the definition therefore emphasises the capacity of firms to appropriately adapt, integrate and reconfigure internal and external firm skills, resources, and functional capabilities (Teece et al., 1997). Therefore DCs are the ability or capacity of firms to change their static capabilities to match the requirements of both internal and external changing environments.

Table 2-3  Definitions of DCs

<table>
<thead>
<tr>
<th>Authors</th>
<th>Definition of DCs</th>
</tr>
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<tbody>
<tr>
<td>Teece and Pisano (1994)</td>
<td>The subset of the competences/capabilities which allow the firm to create new products and processes and respond to changing market circumstances.</td>
</tr>
<tr>
<td>Teece et al. (1997)</td>
<td>The firm’s ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments.</td>
</tr>
<tr>
<td>Eisenhardt and Martin (2000)</td>
<td>The firm’s processes that use resources - specifically the processes to integrate, reconfigure, gain and release resources - to match or even create market change. Dynamic capabilities thus are the organisational and strategic routines by which firms achieve new resources configurations as market emerge, collide, split, evolve and die.</td>
</tr>
<tr>
<td>Griffith and Harvey (2001)</td>
<td>A global dynamic capability is the creation of difficult-to-imitate combinations of resources, including effective coordination of inter-organisational relationships, on a global basis that can provide a firm a competitive advantage.</td>
</tr>
<tr>
<td>Zahra and George (2002)</td>
<td>Dynamic capabilities are essentially change-oriented capabilities that help firms redeploy and reconfigure their resource base to meet evolving customer demands and competitor strategies.</td>
</tr>
<tr>
<td>Zollo and Winter (2002)</td>
<td>A dynamic capability is a learned and stable pattern of collective activity through which the organisation systematically generates and modifies its operating routines in pursuit of improved effectiveness.</td>
</tr>
<tr>
<td>Helfat and Peteraf (2003)</td>
<td>Dynamic capabilities involve adaptation and change, because they build, integrate, or reconfigure other resources and capabilities.</td>
</tr>
<tr>
<td>Zahra et al. (2006)</td>
<td>We view dynamic capabilities as the abilities to reconfigure a firm’s resources and routines in a manner envisioned and deemed appropriate by the principal decision-maker(s).</td>
</tr>
<tr>
<td>Helfat et al. (2007)</td>
<td>A dynamic capability is the capacity of an organisation to purposefully create, extend or modify its resource base.</td>
</tr>
</tbody>
</table>
The literature on DCs (Table 2-3) is similar in identifying the essential factors of DCs which are abilities to respond to changes in external environments (e.g. Teece and Pisano, 1994; Teece et al., 1997; Lee et al., 2002; Zahra and George, 2002), abilities to change resources (Helfat and Peteraf, 2003; Zahra et al., 2006; Helfat et al., 2007), and abilities to achieve superior performance (Eisenhardt and Martin, 2000; Griffith and Harvey, 2001; Zollo and Winter, 2002). However, the literature is vague on how these DCs are developed. For example, the Teece et al. (1997) definition posits that DCs are the ability of firms to integrate, build, and reconfigure internal and external capabilities to meet changes in the dynamic markets; however, how this ability is developed was not elaborated. From the definition, DCs are abilities to transform static organisational capabilities or create new ones to meet changes in the environment. Therefore to be able to transform static organisational capabilities to match the dynamic environment, firms have to develop DCs first before they can be used to address the rapidly-changing environment. However, the literature does not address adequately how DCs are developed at the strategic level. Therefore, the present study expands on the DC literature to include this.

### 2.2.3.3 Features of DC concept

There are certain features associated with DCs. Teece et al. (1997) identified that DCs are unique and idiosyncratic in detail. Eisenhardt and Martin (2000), expanding on the features of DCs, explained that although DCs are idiosyncratic in detail, it is equally important to note that there are some commonalities associated with the concept. They identified five commonalities of DCs across firms and these are viewed as best practices: (1) Using cross-functional teams with different expertise in the firm’s operations. (2) Alliances, firms coming together to bring new resources into the firm from external sources. (3) Patching, a strategic process that centres on routines to realign and match businesses and their resources to changing market opportunities. (4) Knowledge brokering. (5) Strategic decision-making.

These common features can be identified in the DCs because of the various effective ways of dealing with firm, interpersonal and technical challenges that firms in dynamic markets encounter. The commonalities associated with the DC concept occur due to following: (1) Equifinality, which states that firms may have several different ways in which managers initiate the creation of their DCs in different and
unique paths. However, they may end up with DCs that are similar in key attributes. For example, Cockburn et al. (2000) identified multiple ways of creating the same DCs. In their studies of the emergence of propublication\(^3\) incentives, they identified that managers began with different initial conditions and propensities for adoption, and followed different adoption paths, but eventually, managers at most of the firms adopted propublication incentives for scientists working on their projects (Eisenhardt and Martin, 2000). (2) Homogeneity, which implies that routines for developing DCs are homogeneous so they can be fungible across different business contexts. Fungibility implies the efficacy of particular DCs across a range of industries (Eisenhardt and Martin, 2000). However, it must be noted that although DCs have common key features, they differ in detail across firms (Eisenhardt and Martin, 2000). (3) The commonalities associated with the DC concept imply that just possessing DCs alone is not a guarantee for sustained competitiveness, but rather the source of competitiveness lies in the processes through which firms develop and apply DCs (Eisenhardt and Martin, 2000).

### 2.2.3.4 Limitations of DC concept

Many criticisms have been levelled against the DC concept, which vary from using obscure concepts that are tautological and without empirical proof to the concept being vague (Mosakowski and McKelvey, 1997; Williamson, 1999; Priem and Butler, 2000; Jantunen, 2002; Easterby-Smith, 2006).

The status of the DC concept amongst theories of the firm is still not established, partly due to the lack of empirical verification of the conceptual propositions of the concept. It is therefore considered as still in its infancy stages when compared with the IO framework and the RBV (Metcalfe and James, 2000; Newbert, 2007). Further, the lack of a coherent theory of DCs stems from the fact that most studies of DCs are largely conceptual, drawing on findings from different empirical streams of literature, such as product innovation, supplier relationships, human resources, and marketing, to explain DCs (Teece et al., 1997; Eisenhardt and Martin, 2000; Zollo and Winter, 2002; Bowman and Ambrosini, 2003; Zott, 2003).

\(^3\) A common feature of effective knowledge creation in the pharmaceutical industry (Eisenhardt and Martin, 2000).
Further, the potential of DCs for achieving competitiveness has been criticised for lack of grounding in empirical research of the mechanisms through which DCs are developed. Most research works on DCs focus on identifying how DCs assist firms to achieve competitiveness. However, how DCs are developed has not been adequately explained. The DC concept therefore introduces complexity, vagueness, and room for individual interpretation. On the whole, the DC literature does not provide a concrete model for studying how firms develop DCs at the strategic level.

The DC concept lacks clarity because it is riddled with inconsistencies, and there is lack of agreement between what static organisational capabilities and DCs are (Zahra et al., 2006). Most often, researchers (Mosakowski and McKelvey, 1997; Priem and Butler, 2001) have criticised the DC concept because it tends to be confused with its outcome. For example, Eisenhardt and Martin (2000) identified DCs as processes such as product development, alliances, acquisitions, and strategic decision-making. A DC is a capacity to change capabilities, skills and resources, and not the actual activities or routines through which DCs are created and outcomes. So the question is asked whether if a firm conducts product development, it means that the firm possesses DCs.

The inconsistencies in the DC literature are compounded when DCs are equated with superior performance. This happens when the value of DCs is defined in terms of their effects on performance, and superior performance is equated with the possession of DCs (Williamson, 1999; Priem and Butler, 2001; Zahra et al., 2006). This therefore suggests that having DCs automatically leads to superior performance. As a result of these inconsistencies, DCs have been conceptualised and assessed in such ways that it makes it difficult to separate their existence from their effects. Further, these inconsistencies in the DC literature do not provide clear answers to the questions of what type of capabilities are effective in certain situations and how these capabilities should be created in the firms (Williamson 1999; Cockburn et al., 2000), especially at the strategic level. These inconsistencies therefore limit the effectiveness of the DC concept for firm performance analysis.
2.2.4 Literature on Creating DCs

In the DC literature, there is evidence of a few studies (e.g. Teece et al., 1997; Eisenhardt and Martin, 2000; Zollo and Winter, 2002; Zott, 2002; Bowman and Ambrosini, 2003; Zahra et al., 2006) that describe the creation of DCs at the strategic level. Teece et al. (1997), for instance, maintain that DCs are developed through specific managerial and organisational processes, which are shaped by the firm's asset position and its path dependencies. Similarly, other researchers expanding on the DC concept identified some of these processes for creating DCs: resource integration, resource reconfiguration, gaining and releasing resources (Eisenhardt and Martin, 2000); knowledge creation, articulation and codification (Zollo and Winter, 2002); capability lifecycle: founding, developmental and maturity stages (Helfat and Peteraf, 2003); resource reconfiguration, leverage, learning and integration (Bowman and Ambrosini, 2003); entrepreneurial activities, dedicated leveraged resources, and skills and learning processes (Zahra et al., 2006). Although these studies provide evidence of how DCs are created at the strategic level, they are largely conceptual and do not present a coherent theory of creating DCs at the strategic level.

For example, Helfat and Peteraf (2003) described the process of creating DCs using the lifecycle approach. Their capability lifecycle involves three stages. It begins with a founding stage, which lays the basis for subsequent development of the capability. This is followed by a developmental stage, which is marked by gradual building of capability, and finally a maturity stage. According to Helfat and Peteraf (2003: 1000), "Once the capability reaches the maturity stage or even before then, a variety of events may influence the future evolution of the capability". The capability may then divert into one of the six additional stages of the capability lifecycle: retirement, retrenchment, renewal, replication, redeployment and recombination. They also identified that the creation of DCs is triggered by both internal and external factors. However, their work, and indeed the DC literature, is silent on knowing when capabilities have reached maturity and what impact this will have on the performance of firms.
Though there is some evidence in the literature of the process of creating DCs at the strategic level, it was however argued by Mosakowski and McKelvey (1997), Williamson (1999) and Priem and Butler (2001) that because of this prevalence of conceptual research, the DC concept lacks an empirical base and is often a tautological concept. Eisenhardt and Martin (2000) argued that the creation of DCs is guided by well-known learning mechanisms, and DCs as specific processes have rich empirical research bases. This research on DCs to which they referred was based on the individual functional areas of firms and not the actual strategic level process of creating DCs.

These conceptual theories could have been used to develop such a strategic level process, but the lack of an empirically-derived process would not be resolved. For example, even Teece et al. (1997) stated that they had merely sketched the framework for developing DCs, and further empirical studies were required to strengthen the framework. Bowman and Ambrosini (2003) maintain that the processes of creating DCs are poorly understood. Zahra et al. (2006) have stated that a model which integrates prior findings and the evolution of DCs is lacking. Wang and Ahmed (2007) have sought to follow Zahra et al. (2006) and synthesise prior literature to develop a model of DCs, but this is once more a conceptual model, and in drawing on research from multiple functional areas still does not address the most critical limitation of DC research: the model is not empirically derived and does not reflect the process of creating DCs at the strategic level. Easterby-Smith (2006) and Peteraf (2006) have both emphasised the need for more empirically-derived theory of the process of creating DCs to develop the DC concept further and so move this literature forward. Thus, developing a theory based on the conceptual literature alone would not help to resolve the limitations of the DC concept in being tautological and lacking empirical verifications for development at the strategic level. Therefore, developing a theory of the process of creating DCs at the strategic level which is empirically derived is very significant.

Some recently published studies provide empirical evidence on the evolution of DCs. These have tried in one way or another to give useful insights into the process of creating DCs, and have managed to capture the process of creating DCs in functional areas of the firm (Deeds et al., 2000; Katzy et al., 2001; Rindova and
Kotha, 2001; Danneels, 2002; Rindova and Taylor, 2002; Zhu and Kraemer, 2002; Salvato, 2003; Ethiraj et al., 2005; Lazonick and Prencipe, 2005; Menguc and Auh, 2006). These empirical research works can be found in different disciplines such as economics, IT strategy, marketing, product development, innovation and biotechnology. Some of these empirical studies have explained the processes of developing a specific capability, whilst others have measured specific capability creation in terms of firm performance. This section proceeds by explaining in detail these empirical studies and their limitations.

Deeds et al. (2000) studied DCs and new product development in high technology ventures in new biotechnology firms. The aim of the study was to test the relationship between new product development capabilities and the firm’s scientific, technological and managerial skills. According to these researchers, the development of a new product is a function of choice of geographic location, scientific team, and leadership with knowledge and experience in new product management. Their research focused specifically on the functional level process (product development) of developing DCs and not on the development of a coherent theory of how DCs are created at the strategic level. Further, they developed their model from the literature before testing, and drew on multiple units and levels of analysis. Consequently, their model may be mis-specified and suffers in not being grounded in data. Furthermore, only a limited number of variables for developing DCs were examined. Deeds et al. (2000) admit that although they found a strong empirical support for their model, it must be noted that there is still a significant amount of variation in the rate of new product development of the firms in their sample which remains unexplained. Hence, there are other variables for developing DCs which were not covered in their study such as scientific capabilities of a firm, which are likely to be of significance.

In the same area of product innovation, Verona and Ravasai (2003) carried out research into the DCs for continuous product innovation. They identified knowledge creation and absorption, knowledge integration and knowledge reconfiguration as sources of creating the DC of innovativeness. The study shows how these knowledge-based processes are dependent on a coherent mix of firm resources for continuous innovation. This study is based on a firm-specific function, product innovation using learning activities, to differentiate from previous DC research. The
process of how the identified DC is created before being used is not clearly stated in their research. Their study cannot claim the totality of activities for creating DCs, because they stated that they have clarified the nature and content of some of the valuable managerial processes for creating DCs and not all. It is also based on a single case study; hence there are issues of generalising the findings.

In the entrepreneurial area, Katzy et al. (2001) conducted research into entrepreneurial DCs of management and how these evolve. This was achieved through an exploratory case study. They identified two DCs (incubating and grafting) and described how they support entrepreneurial venturing. Drawing on the DC framework by Teece et al. (1997), they traced the development of these two DCs through processes, positions and path dependency at Siemens ICE. However, their research identified only two DCs, which cannot claim to be the total possible DCs available, and thus they cannot be used alone to construct a framework for strategic level development of DCs. It is also limited to entrepreneurial ventures, as it does not consider large established firms and the possible effects of size, resource availability and R&D potential that arise from this. According to Katzy et al. (2001), future research should provide a framework of the process for creating DCs for firms competing in turbulent environments.

Rindova and Taylor (2002) examined the evolution of DCs in firms. In particular, their study examined how managers learn about firm capabilities in dynamic markets. Their findings show that the core processes through which DCs evolve are 'upgrading the management capability of the firm' and 'reconfiguring market competences'. They identified the development of DCs as change processes at two levels: a micro and a macro evolution. The micro evolution is associated with upgrading the organisation's management capability. The macro evolution is associated with developing new market competences in order to respond to changing customer demands. These two evolutionary processes of creating DCs are triggered by changing perceptions of top managers about what it takes to succeed in their markets, and the type of markets and managerial competences required to respond to changes in the external environment. Rindova and Taylor (2002) identified only two activities for creating DCs. Whilst this is a useful contribution to the field, it does not cover many other activities that may be significant to DC creation and it does not
offer a coherent theory for developing DCs at the strategic level. They admit that they have not covered all the activities and emphasise the need for research into the actual processes of creating DCs to further develop the concept.

Christiaanse and Venkatraman (2002) studied how electronic channels are used in the airline industry to develop capabilities in the IT area. The distinctiveness of the study is based on the role of IT and computer technology in creating advantage through differential expertise. The study focused on the functional aspects of marketing and IT capabilities and the analysis centred on the relationship between IT capabilities and firm performance. Their findings show that it is necessary to extend the theoretical perspectives on IT-induced inter-firm relationships from an efficiency perspective to an expertise point of view. This study was conducted at the functional level of developing DCs, and did not consider the strategic level process of creating DCs. It also suffers from criticisms of tautology, which the authors admit may be an issue due to collinearity problems between their central variables. Similarly, McPherson et al. (2004) also studied DCs in a knowledge-dependent firm and their focus was on the technological and organisational innovation which facilitated rapid growth in a small firm. Their findings revealed that the relational elements of inter-firm transactions provide entrepreneurs with the opportunity to expand their firm DCs. Based on a functional process of creating DCs, this research focused only on the activities of directors as a means for developing DCs and this limits its applicability for developing a coherent understanding of DC creation. In addition to this, their study focused on a single case study and thus generalising the findings is limited to small firms.

Wooten and Crane (2004) conducted a study into the human factors that contribute to the development of DCs. They identified that DCs are generated through a humanistic (relationships, compassion, virtuous actions, and honourable behaviour) work ideology. From the findings, they developed a framework to explain the humanistic work ideology and also how institutional pressures legitimise this work ideology. According to them, developing a DC involves (1) developing humanistic work ideology, (2) executing humanistic work ideology which leads to (3) HRM capabilities. These three stages lead to (4) preserving humanistic ideology. Stages (3) and (4) then lead to service DCs. This study focuses on a functional level approach
(human resource) once more and is limited in terms of its generalisability, as it is based on a single case.

Ethiraj et al. (2005) examined where capabilities come from and how they affect firm performance. Based on a single case study in the software industry, they examined how project management capabilities are created and how they impact on performance. They identified two capabilities at the project level in the software industry, which are client-specific\(^4\) and project management capabilities. They argued that when these capabilities are improved, it leads to superior project management (DC) and profitability in the firm. Their findings reveal that identifying the capabilities that are the sources of performance differences need to be contextually grounded, and hence it is important to consider this when identifying and measuring capabilities. They stated that their research has made an initial step in teasing out the importance of capabilities and estimating their impact on performance, therefore more research on DCs is required. This study is limited in a number of ways, however. First, they also define the development of capabilities in terms of performance. Second, generalising the findings is limited because they are based on a single industry case study.

The literature review and analysis revealed some empirical literature on the process of creating DCs. However, the literature tends to concentrate on one or two functions of the firm. Thus, the research of a single capability such as product development or how to carry out post-acquisition effectively in a firm is a necessary condition to enhance understanding of how to create DCs, but is not sufficient condition to develop a coherent process of creating strategic level DCs. This is due to the fact that single capability research helps to understand a particular value creation process and explains how to organise specific capabilities. However, the integration and coordination of the development of a capability bundle is not solved with the ability to organise one activity or capability effectively. Furthermore, DC as a theory needs research to build up a coherent and consistent set of statements which answer the

\(^4\) Client-specific capabilities are a function of repeated interaction with a given client across multiple projects over time. They largely reflect tacit knowledge of the client's business domain and operating routines acquired through repeated interaction with the client (Ethiraj et al., 2005: 26).
main questions addressed to the concept of DC in relation to the firm, and which are then empirically testable (Jantunen, 2002).

2.2.4.1 Research Question

Although the research presented provides some evidence on the conceptual and functional level creation of DCs, there are numerous limitations to these studies, the most prominent of which is the lack of a coherent explanation provided on the actual process of developing DCs at the strategic level (Volberda, 2004). This is a significant gap in the literature and one that limits significantly the potential for this stream of literature to be of importance to practising strategic managers. According to Wang and Ahmed (2007: 31), "Research on DCs has been conducted on piecemeal basis and research finding remain disconnected". Hence, the development of the DC field is being advanced in a piecemeal fashion by incremental contributions made by researchers examining various functional areas of businesses. Consequently, and as was revealed in the preceding literature review, our understanding of DC creation and the process that underlies it at the strategic level is undermined. Therefore the research question that this study addresses is:

\textit{How do firms create dynamic capabilities at the strategic level?}

The explication of DCs as a scientific theory remains sketchy and insufficiently covered in empirical research. The present study therefore examines empirically the development of a process of creating DCs at the strategic level with a view to creating a coherent theory of this process.
2.3 PROCESS OF CREATING DYNAMIC CAPABILITIES AT STRATEGIC LEVEL 

The process of creating DCs depicts the general methods that characterise the evolution of DCs. There is a growing literature on the subject of DCs in strategic management, economics and organisational theory. The following section examines in detail the various processes of creating DCs.

2.3.1 Organisational and Managerial Routines

Organisational and managerial routines involve the assembling of firm-specific assets into integrated clusters of functions spanning around individuals and groups to enable distinctive activities to be performed (Teece et al., 1997). Examples of these routines in firms include quality, miniaturisation, and systems integration (Teece et al., 1997). Organisational and managerial routines involve the following: integration and coordination, learning, and reconfiguration.

2.3.1.1 Integration and coordination routines

Integration and coordination refer to how managers coordinate or integrate knowledge inside the firm. This process involves both internal and external activities. How effectively internal integration or coordination is achieved is very important in the development of DCs in firms (Teece et al., 1997; Eisenhardt and Martin, 2000; Bowman and Ambrosini, 2003). Equally important, achieving competitiveness requires the integration of external activities and technologies. Examples of external coordination and integration include alliances, the virtual corporation, buyer-supplier relations, and technology collaboration (Teece et al., 1997; Eisenhardt and Martin, 2000). Integration and coordination routines in firms are usually applied in product development and strategic decision-making. Internal

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5 This section reviews literature specifically on the process of creating DCs at the strategic level. A literature review on this process, which is the substantive focus of this research, was not undertaken during the initial stages of this study. A detailed review was conducted during data analysis, when concepts and categories of the theory began to emerge from the data. The literature was then fully incorporated into the major categories and sub-categories of the substantive theory. By delaying the literature review on the substantive area, the researcher avoided bringing in preconceived concepts before they emerged from the data (Strauss and Corbin, 1998; Goulding, 2002). The literature reviewed on the process of creating DCs is used in a critique of the developed theory in Chapter 7; however, for ease of reading, the background of the literature has been presented here.
resources involve product development routines, through which managers combine their respective skills and functional backgrounds to create profitable product and services (Clark and Fujimoto, 1991, Dougherty, 1992; Eisenhardt and Martin, 2000). Integration and coordination routines can also be identified in strategic decision-making by which managers pool their managerial expertise, business and functional skills to take various strategic decisions amongst alternatives that shape and direct the strategic paths of the firms (Eisenhardt and Martin, 2000).

2.3.1.2 Learning routines

The organisational learning literature is informative for understanding DCs. Organisational learning refers to experience-based improvement in organisational task and performance (Argyris and Schon, 1978). According to Huber (1991: 89) "an entity learns if, through its processing of information, the range of its potential behaviours is changed". New knowledge and its use in the processes of the firm is an essential building block of new capabilities (Huber, 1991). However, it must be noted that not all forms of organisational learning are linked with capability development (Huber, 1991). For example, Argyris and Schon (1978) distinguished between single-loop learning and double-loop learning. Single-loop learning does not bring about change in the knowledge structures of the firm; it is more reactive. In contrast, double-loop learning is a proactive learning process that affects changes in the knowledge structures of the firm and enables firms to develop capabilities (Lei et al., 1996).

Learning is a process by which repetition and experimentation enable firms to perform tasks better and quicker, and discover new opportunities (Teece et al., 1997; Bowman and Ambrosini, 2003; Zott, 2003). The key characteristics of learning include firm as well as individual skills. Individual skills are very important in the learning process; however, their relevance depends on the individual’s deployment of these skills in learning. Learning is intrinsically social as well as collective. It occurs both in imitation and emulation of individuals (master-apprentice relationship) and the joint contributions to the understanding of complex problems (Teece et al., 1997). Learning requires common codes of communication and coordinated search process. For instance, the ability to search for knowledge is an integral part of organisational learning (Huber, 1991; March, 1991). The evolution of
DCs follows a unique pattern in firms, which is shaped by well-known learning mechanisms such as knowledge creation within the firms, and these learning mechanisms guide the evolution of the DCs (Zollo and Winter, 2002). The learning approach focuses on the way new knowledge can be acquired and how to improve firm capabilities. The firm’s capability to learn is therefore a capability to transform knowledge into further knowledge, and thus applies to knowledge itself.

Most conceptual theories about organisational learning and the development of DCs can be seen in the research works of Nelson and Winter (2000) and Zollo and Winter (2002). The latter attributed the development of DCs to collective learning. They defined the DC as “a learned and stable pattern of collective activity through which the firm systematically generates and modifies its operating routines in pursuit of improved effectiveness” (Zollo and Winter, 2002: 340). Based on arguments derived from both the behavioural and cognitive traditions in organisational learning studies, they developed a framework for the creation of DCs through the co-evolution of three learning mechanisms: knowledge creation (tacit accumulation of past experience), knowledge codification, and articulation processes. Zollo and Winter (2002) perceive the process of creating DCs as structured, with persistent routines and learning mechanisms. Eisenhardt and Martin (2000) also identified that gaining and releasing of resources for developing DCs are carried out through knowledge creation routines, acquisition processes, experiential learning, and exit routines.

Knowledge creation is one of the learning routines through which DCs are developed and it is a process whereby managers and their employees build new ideas within the firm. It involves firm processes as well as individual skills. There are different ways through which knowledge is created in firms, and these are alliances and acquisitions, experiential learning, repeated learning, and exit routines. Alliances and acquisitions bring new ideas and resources into the firm from external sources, which create knowledge in the firm (Henderson and Cockburn, 1994; Zollo and Singh, 1998; Eisenhardt and Martin, 2000). According to Zahra et al. (1999: 173), “Acquisitive learning occurs when a firm acquires and internalises knowledge that pre-exists externally to its boundaries through vicarious learning, grafting and searching and noticing”. Further, collaboration may also serve as a vehicle for inter-firm learning which helps firms to recognise dysfunctional routines and prevent
strategic blind spots (Mody, 1993; Zollo and Winter, 2002). Experiential learning focuses on an internal search process. It occurs mainly inside the firm and creates knowledge that is adapted to and is specific to the firm. Repeated learning (the process of doing the same routine over a period to time), for example, is seen as a significant source of DC evolution. Repeated practice is an important learning mechanism for the development of DCs because it helps individuals to understand firm processes more fully to develop more effective routines (Eisenhardt and Martin, 2000). Exit routines refer to the process by which managers discard resource combinations that no longer provide competitiveness to the firm. Managers use exit routines to divest under-performing resources to external sources (Eisenhardt and Martin, 2000; Zollo and Winter, 2002).

Knowledge codification is the second learning mechanism through which DCs are developed. This involves the capture and storage of performance implications of internal routines in written tools such as manuals, blueprints, spreadsheets, decision support systems and project management software in the firm (Zollo and Winter, 2002). Finally, the codification of experience into technology and formal procedures makes the experience acquired from learning easier to apply and accelerates the building of routines (Eisenhardt and Martin, 2000; Zollo and Winter, 2002).

Knowledge articulation is the third learning mechanism for creating DCs. Zollo and Winter (2002) identify knowledge articulation as the process through which implicit knowledge is articulated through collective discussions, debriefing sessions, and performance evaluation processes. By sharing their individual experience and comparing their opinions with those of their colleagues, firm members can achieve an improved level of understanding of the causal mechanisms intervening between the actions required to execute a certain task and the performance outcomes produced.

2.3.1.3 Reconfiguration routines

Reconfiguration involves changes in the structure of firms, and since firms are interrelated, a change in one structure will result in changes in the other structures of the firm (Teece et al., 1997; Eisenhardt and Martin, 2000; Bowman and Ambrosini, 2003). Firms have to learn and develop the ability to reconfigure their asset structure
and accomplish the necessary internal and external transformations in rapidly changing market environments (Teece et al., 1997; Eisenhardt and Martin, 2000; Bowman and Ambrosini, 2003). The process of reconfiguration for developing DCs requires constant surveillance of the markets and emerging technologies, and the ability to adopt the best practices in markets (Teece et al., 1997). Effective reconfiguration routine depends on certain factors such as locally autonomous firm processes, ability to scan the environment, ability to evaluate markets and competitors, and the ability to quickly accomplish reconfiguration and transformation ahead of competitors. For example, benchmarking practice provides an effective tool in the reconfiguration and transformation process. Zairi (1994) stated that benchmarking is a continuous process of measuring products, services and processes against those of competitors or world leaders in their field. Benchmarking therefore assists firms to search for information they need about their own internal operations and the best practices of performing firms in their markets. It enables management to measure the firms’ current operations against competitors in their marketplace. The firms then adopt the best practices identified in the market place and use them as a springboard to improve (transform and reconfigure) their own asset capabilities (Zairi, 1994; Teece et al., 1997).

Eisenhardt and Martin (2000) identified transfer processes, resource allocation routines, co-evolving and patching as reconfiguration processes. Reconfiguration of resources within the firm involves transfer processes of resources, which includes routines for replication\(^6\) and brokering\(^7\). Managers use these processes to copy, transfer and recombine resources, especially knowledge-based resources, within the firm (Szulanski, 1996; Hansen, 1999; Eisenhardt and Martin 2000). Replication and transfer are quite difficult to achieve in a firm, with the exception of people (employees) transfer. This is due to the fact that capabilities and the routines upon which they rest are difficult to replicate, because most often, there is no codified information on those capabilities. The only way that this may be possible is when investments are made to convert tacit knowledge to codified knowledge (Teece et al., 1997).

\(^6\) Replication involves transferring or redeploying competences from one concrete economic setting to another (from one company to the other) (Teece et al., 1997).

\(^7\) Brokering is the interactive processes through which knowledge-based resources are transferred between the producers and users of knowledge (Eisenhardt and Martin, 2000).
Co-evolving routines occur at a more strategic level. Co-evolving involves routines through which managers reconnect webs of collaboration among various parts of the firm to generate new ideas and synergistic resource combinations amongst businesses (Eisenhardt and Galunic, 2000; Eisenhardt and Martin, 2000). Patching is a process that centres on routines to realign the match-up of business (i.e. add, combine and split) and their interrelated resources to changing market opportunities (Brown and Eisenhardt, 1998). Resource allocation routines are used by firms to distribute scarce resources such as capital and manufacturing assets from central points within the hierarchy (Burgelman, 1994). This enables the deployment of resources to areas in the firm where they are needed most to develop the DCs required.

2.3.2 Asset Positions of Firm

The developments of DCs are shaped by the asset positions of the firm, which are the resources available to the firm to develop DCs (Teece et al., 1997). Positions of the firm refer to the unique, inimitable and irreplaceable combinations of assets because of their contextual dependence, tacit nature, and causal ambiguity (Lippman and Rumelt, 1982; Teece et al., 1997; Helfat and Peteraf, 2003). Positions are the current assets endowments such as technological assets, complementary assets (assets related to technology) which enhance or destroy the value of assets, financial assets (cash position), reputation, and relational assets (intangible assets that enable firms to achieve various goals in the market), structural assets (formal and informal structure of firms), institutional assets (regulatory systems, laws, higher education, national culture), market (structure) assets, and firm boundaries (degree of integration either vertical, lateral and horizontal). These assets are very important in the development of DCs because they actually determine the competitiveness of a firm at a given time and may determine the kind of innovation and changes that can be undertaken (Teece et al., 1997).

2.3.3 Path Dependency

According to Teece et al. (1997), the development of DCs is also shaped by the path dependency of a firm. Paths refer to a firm’s previous investments and its repertoire of routines and how these constrain its future (Teece et al., 1997). Path dependency
therefore refers to the function of a firm's current position, the history of the strategic decisions it has taken, and the strategic alternatives in the future (Teece et al., 1997). They maintain that the 'history matters' of the firm's path are very important in shaping the one that lies ahead. Where a firm can go is a function of its current position and the paths ahead. Hence, a firm's previous investments and its routines (its history) constrain its future behaviour, and this is due to the fact that opportunities for learning are 'close in' to previous activities (Teece et al., 1997). Since learning is a gradual process, changes in firms should be conducted gradually from the previous routines to the present. Eisenhardt and Martin (2000) emphasise this point and stated that the evolutionary path of a firm must be paced and cannot occur so fast that knowledge cannot be effectively integrated, nor too slowly so that firms might quickly forget past learning.

2.4 SUMMARY

This chapter reviewed literature on the IO framework, RBV, the DC concept, and the process of creating DCs. The first part of the chapter presented a detailed analysis of the basic assumptions, components and limitations of both the IO and RBV frameworks. It further explained how the limitations within the IO and RBV frameworks paved the way for the development of the DC concept. The chapter then examined in detail what capabilities are, and the origin, definition, features, limitations of the DC concept, and the identification of the research gap and question. The second part of the chapter reviewed literature on the process of creating DCs at the strategic level to identify the similarities and differences between the developed theory and extant literature. The rationale for conducting the literature review was to facilitate the collection of more data to further enhance the developing concepts and the verification of the developing theory through comparison with extant literature. The literature review illustrated that some recently published research provides some evidence of the evolution of DCs. These studies have given useful insights into the process of creating DCs and highlighted areas for further research to contribute to the DC literature.
CHAPTER 3 RESEARCH DESIGN

3.1 INTRODUCTION

This chapter presents the research design of the study, and is divided into two main parts. The first part examines the interpretive philosophy adopted, and the second part discusses the research strategy, which involved analysis of the different methods of qualitative research and the selection of the GTM approach for this research. Further, the chapter explains the origin and nature of the GTM, similarities and difference between the GTM and other qualitative methods, the types of theory, and how theory is generated from the GTM approach.

3.2 RESEARCH PHILOSOPHY

Research is grounded in certain philosophical perspectives. It is important that a researcher considers the philosophy of the study, since ignoring it can affect the quality of the research and may even render it irrelevant (Neuman, 2000). Understanding the philosophical positioning of a research is useful because it assists researchers to clarify alternative designs and methods for a particular research, and the method that would be appropriate for the type of study being conducted (Easterby-Smith et al., 1991). There are many philosophies such as rationalism, positivism, empiricism, and interpretivism; however, positivist and interpretivist philosophies are considered the two major philosophies in social research (Goulding, 2002). Table 3-1 below presents the features of these two major philosophies.

3.2.1 Positivism

Positivists believe that reality is stable and can be observed and described from an objective viewpoint, without interfering with the phenomena being studied (Levin, 1988). According to the positivists, a phenomenon should be isolated and observations should be repeatable.
Table 3-1 Features of Two Major Philosophies

<table>
<thead>
<tr>
<th>Basis of Comparison</th>
<th>Positivist Philosophy</th>
<th>Interpretivist Philosophy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic beliefs</td>
<td>World external and objective</td>
<td>World socially constructed and subjective</td>
</tr>
<tr>
<td></td>
<td>Observer independent</td>
<td>Observer part of what is observed. Science driven by human interests</td>
</tr>
<tr>
<td>Researchers focus</td>
<td>Focus on facts</td>
<td>Focus on meanings</td>
</tr>
<tr>
<td></td>
<td>Look for causality and fundamental laws</td>
<td>Try to understand what is happening</td>
</tr>
<tr>
<td></td>
<td>Reduce phenomena to simplest elements</td>
<td>Look at totality of each situation</td>
</tr>
<tr>
<td></td>
<td>Formulate hypotheses and then test them</td>
<td>Develop ideas through induction from data</td>
</tr>
<tr>
<td>Preferred methods</td>
<td>Operationalising concepts so they can be measured</td>
<td>Uses multiple methods to establish different views of phenomena</td>
</tr>
<tr>
<td></td>
<td>Taking large samples</td>
<td>Small samples investigated in-depth or over time.</td>
</tr>
</tbody>
</table>

Source: Easterby-Smith et al. (1991: 2)

This would usually involve the manipulation of reality with variations in only a single independent variable, so that standard patterns within the variables may be identified. These patterns identified will help form relationships between some of the constituent elements of the social world. Positivists therefore can make predictions based on the previously observed and explained realities and their inter-relationships (Patton, 2002).

According to Hirschheim (1985: 33), "Positivism has a long and rich historical tradition. It is so embedded in our society that knowledge claims not grounded in positivist thought are simply dismissed as unscientific and therefore invalid". Therefore for the positivist, real knowledge is only knowledge based on observed facts (Comte, 1853). Positivism has also had a particularly successful association with the physical and natural sciences and is usually associated with quantitative research. "A quantitative research methodology is appropriate where quantifiable measures of variables of interest are possible, where hypotheses can be formulated and tested, and inferences drawn from samples to populations" (Liebscher, 1998: [46])
Quantitative methods have been used for purposes of isolating causes and effects, operationalising theoretical relations, and measuring and quantifying phenomena, which allows for the generalisation of findings (Denzin and Lincoln, 2005). Quantitative researchers use methods such as surveys, and field and laboratory experiments.

Positivism has been criticised in social research as pseudo-scientific, inflexible, myopic, mechanistic, outdated, and limited to the realm of testing existing theories at the expense of new theory development (Goulding, 2002). It has been argued that quantitative methods are entirely unsuitable for the social sciences (Hirschheim, 1985; May, 1994). For example, firm reality, which is considered complex, is not easily amenable to statistical deductions. Quantitative methods are also regarded as too deeply rooted in functionalism and too concerned with causal analysis at the expense of getting close to a phenomenon being studied (Galliers, 1991).

### 3.2.2 Interpretivism

Interpretive philosophy holds the view that reality is socially constructed and we can only understand reality through a subjective interpretation (Denzin and Lincoln, 2000). Knowledge of reality is gained through social construction such as language, shared meanings, tools and documents (Walsham, 1993). In interpretive research, there are no predefined dependent and independent variables; rather, the focus is on unravelling the complexity of human sense-making as the situation emerges (Kaplan and Maxwell, 1994). Hence, qualitative researchers use a range of interconnected interpretive practices with the hope of getting a better understanding of the phenomenon at hand (Denzin and Lincoln, 2005).

The interpretive philosophy is usually associated with qualitative research. According to Denzin and Lincoln (2005: 3), "Qualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible. These practices transform the world... Qualitative research involves the studies used and collection of a variety of empirical materials—case study; personal experience; introspection; life story; interview; artefacts; cultural text and productions; observational, historical, interactional, and visual texts—that describe routine and problematic moments and
meanings of individuals' lives". Interpretivists admit that there may be many interpretations of reality, but maintain that these interpretations are in themselves a part of the scientific knowledge they are pursuing to understand reality (Goulding, 2002). The interpretive philosophy has been criticised for its lack of scientific rigour for conducting research (Denzin and Lincoln, 2005). Qualitative research is often termed as unscientific or subjective. Further, qualitative research has been designated as fiction and not science, because there are no ways of verifying the truth in its statements (Denzin and Lincoln, 2005).

3.2.3 Debates Surrounding the Two Research Philosophies

There have been ongoing debates on these two philosophies of research. On the one hand are positivists who perceive qualitative study as unscientific, value laden, lacking rigour and validity, unable to be generalised, and distorting canons of ‘good’ science (Denzin and Lincoln, 2000). Hence, very often, qualitative research is viewed as exploratory and assigned a lower rank on the epistemological ladder (Goulding, 2002). Reacting to criticisms like this, Bryman and Burgess (1994) posit that qualitative methodology, which emphasises epistemological distinctions, is less likely to exhibit a propensity to accept a secondary role in the research process. Essentially, the difference between qualitative and quantitative research is that they have different ways of conducting social research. Table 3-2 below shows the differences between qualitative and quantitative methods of research.

From Table 3-2, rules regarding the art of knowing are clearer in the positivist approach where findings are observable and knowledge claims can be replicated and verified (May, 1994). However, when the research involves the internal context and process of arriving at the findings, positivist philosophy is limited, because it is more focused on the result of a phenomenon than the process (Goulding, 2002). In contrast, qualitative researchers are mostly concerned with the internal processes of arriving at the findings and therefore use a lot intuition or ‘gut’ feelings. This has been criticised by positivists, who deny the role of instinct in qualitative research which is often overcompensated by comprehensive, detailed explanations and explication of the methods (Goulding, 2002).
Table 3-2 Differences between Quantitative and Qualitative Methods of Research

<table>
<thead>
<tr>
<th>Qualitative Methods</th>
<th>Quantitative Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emphasis on understanding</td>
<td>Emphasis on testing and verification</td>
</tr>
<tr>
<td>Focus on understanding from respondent’s/informant’s point of view</td>
<td>Focus on facts and/or reasons for social events</td>
</tr>
<tr>
<td>Interpretation and rational approach</td>
<td>Logical and critical approach</td>
</tr>
<tr>
<td>Observations and measurements in natural settings</td>
<td>Controlled measurements</td>
</tr>
<tr>
<td>Subjective ‘insider view’ and closeness to data</td>
<td>Objective ‘outsider view’ distant from data</td>
</tr>
<tr>
<td>Explorative orientation</td>
<td>Hypothetical-deductive, focus on hypothesis testing</td>
</tr>
<tr>
<td>Process-oriented</td>
<td>Result-oriented</td>
</tr>
<tr>
<td>Holistic perspective</td>
<td>Particularistic and analytical</td>
</tr>
<tr>
<td>Generalisation by comparison of properties and contexts of individual organism</td>
<td>Generalisation by population membership</td>
</tr>
</tbody>
</table>

Source: Ghauri and Gronhaug (2005)

It is evident that both positions have their strengths and weaknesses, but despite these criticisms of both philosophies, some researchers (Kaplan and Duchon, 1988; Lin, 1998) hold the view that the two philosophies are not mutually exclusive and could very well support each other in most social science inquiry for generating valid and valuable knowledge. According to Bryman (1984), the linking of more abstract philosophical issues with questions of research practice offer a more sophisticated way of treating comparability of different methods of investigation than a direct juxtaposition in terms of relative superiority.

3.2.4 Discussion and Rationale for Choice of Philosophical Approach

Identifying epistemology of what constitutes acceptable knowledge in a discipline is an important step in designing a research strategy (Neuman, 2000; Bryman, 2001). Given the richness and complexity of the real world, the chosen research methodology should be one that best suits the problem under consideration and the objectives of that research (Hammersley and Atkinson, 1995). Hence, identification of the epistemological stance between the knower and what can be known in interpreting the data as a basis for selecting the methodology for the study is very important. To understand how DCs are created at the strategic level requires
subjective interpretations which are context specific. Hence, an interpretive philosophy is appropriate for this study, and was therefore adopted.

The rationale for selecting the interpretive philosophy was based on the following. Firstly, this research approach of enquiry suited the research phenomenon (the process of creating DCs), and was relevant to the research aim of developing a theory based on the practical activities in the two participating firms. Secondly, since the phenomenon under investigation lacks an empirically coherent theory of creating DCs at the strategic level, the researcher has to collect data to discover and develop a theory of the process of creating DCs, rather than verifying an already developed framework for this phenomenon. Qualitative researchers embark on a journey of discovery rather than one of verification, and the interpretive philosophy offers the necessary requirements to achieve this purpose. Thirdly, to develop a theory of the process of creating DCs, the research should be done within the context where the process occurs. This process cannot be identified using a quantitative approach, since quantitative methods do not lend themselves very well to issues of internal processes, which are intrinsic (Liebscher, 1998). The interpretive philosophy will therefore assist the researcher to study the activities in the context of the participating firms to understand the process through which these activities are used to develop DCs in the firm. Fourthly, the interpretive philosophy will facilitate the subjective interpretation of this to enable the researcher to formulate theoretical propositions that might become the object of further research and management practice. Fifthly, the interpretive approach is appropriate when the phenomenon under investigation cannot be easily measured from a quantitative point of view (Strauss and Corbin, 1990) due to the sensitive nature and intrinsic meanings of the phenomenon involved. For example, in this research, the issue of how firms develop DCs is a sensitive area and very intrinsic to the sample firms because it borders on their strategy and how they achieve and sustain competitiveness in their markets. Hence, the intrinsic meaning of how DCs are created would not be revealed using a quantitative approach, the reason being that quantitative research does not capture the meanings of social actors because they rely on remote empirical materials for data (Denzin and Lincoln, 2000).
For interpretive researchers, social action is inherently meaningful, and to understand a particular social action, the inquirer must grasp the meaning that constitutes that action (Denzin and Lincoln, 2000). According to Outhwaite (1975) and Fay (1996), a human action is meaningful if it has certain intentional content that indicates the kind of action it is, and/or can only be grasped through the systems of meanings it belongs to. Therefore, to find meaning in an action, it is important to interpret it in a particular way that the actors act or behave. In interpretive research, there are different philosophical perspectives or means of interpreting or understanding a social action (Denzin and Lincoln, 2000). To select the philosophical perspective for this study, the different types of philosophical perspectives in interpretive research were assessed.

The relevant perspectives can be grouped under three main headings: phenomenology, philosophical hermeneutics, and constructionism/constructivism. In this research, a distinction is made between the terms constructivism and constructionism, which illustrates how the process of social construction unfolds among scholars (Patton, 2002). This was done using Crotty’s (1998: 58) distinction and positing “It would be useful then, to reserve the term constructivism for epistemological considerations focusing exclusively on the ‘meaning-making of the individual mind’ and to use constructionism where the focus includes ‘the collective generation [and transmission] of meaning’.” Since the present research is focused on the collective meaning of how firms assign meaning to the process of creating DCs, and not individuals, the ‘constructionism’ philosophical perspective will be used. Table 3-3 below illustrates the three different philosophical perspectives analysed, their focus, and mode of interpretation.

The various categorisations of philosophies in Table 3-3 make them appear independent and mutually exclusive, but this is far from the truth (Deshpandé, 1983). It is important to note that they are not mutually exclusive. You may find that researchers may display characteristics from several epistemologies and philosophies during their research (Deshpandé, 1983; Aram and Salipante, 2003). However, it is important to identify one philosophy that matches closely to the research being conducted to interpret the findings.
## Table 3-3 Interpretive Philosophical Perspectives

<table>
<thead>
<tr>
<th>Type</th>
<th>Focus</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phenomenology</strong></td>
<td>Inquiry philosophy, which aims at gaining a deeper understanding or meaning of everyday experience of person or group of people.</td>
<td>What is important to know is what people experience and how they interpret the world (Denzin and Lincoln, 2000; Patton, 2002). Also sets methodology that could be adopted. Since the only way to know the experience of another person is to actually experience phenomena as directly as possible. In-depth interview and participant observation are main methods that could be used (Denzin and Lincoln, 2000; Patton, 2002).</td>
</tr>
<tr>
<td></td>
<td>Phnomenologist holds the view that all we ever can know must present itself to consciousness, i.e. we can only know what we have experienced by attending to perceptions and meanings that awaken our consciousness. Hence, phenomenological reflections are retrospective and not introspective (Patton, 2002).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>As philosophical stance, phenomenology maintains that interpretation is essential to understanding experience.</td>
<td></td>
</tr>
<tr>
<td><strong>Philosophical Hermeneutics</strong></td>
<td>Hermeneutic philosophy provides theoretical framework for interpretive understanding, or meaning, with special attention to context and original purpose (Patton, 2002).</td>
<td>Hermeneutic philosophy establishes context and meaning for what people do and much clearer about fact that they are constructing ‘reality’ on basis of their interpretations of data with help of participants who provided data (Patton, 2002). Sets study methodology that could be adopted. In-depth interview and observations are main methods that could be used.</td>
</tr>
<tr>
<td></td>
<td>Gadamer (1975) has emphasised that philosophical hermeneutics is not to develop procedure for understanding but to clarify conditions in which understanding takes place. Goal of philosophical hermeneutics is to understand what is involved in process of understanding itself (Madison, 1991).</td>
<td></td>
</tr>
<tr>
<td><strong>Constructionism</strong></td>
<td>Constructionism looks at how people in particular setting construct reality; their reported perceptions, explanations and truths; and consequences of their constructions for their behaviours and for those they interact with.</td>
<td>Focuses on processes and means through which we construct knowledge. However, worth knowing that researchers do not construct interpretations in isolation but against backdrop of shared understanding, practices and language, etc. Sets methodology that could be adopted. In-depth interview and observations are main methods that could be used.</td>
</tr>
<tr>
<td></td>
<td>Ordinary sense of constructionism (also referred to as ‘perspectivism’ in contemporary epistemology (e.g. Fay, 1996), holds view that all knowledge claims and evaluation take place within conceptual framework through which world is described and explained.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>According to Gergen (1994: 78) constructionism is nothing more or less a form of “intelligibility— an array of propositions, arguments, metaphors, narratives, and the like - that welcome inhabitation”.</td>
<td></td>
</tr>
</tbody>
</table>
Since this research is focused on organisation and management process, which tends to be subjective, the findings of the research have to be interpreted in a philosophy that is suitable to the type of research being conducted.

Analysis of the philosophies revealed that phenomenology focuses only on people's experience and their own interpretations of reality. Hence, the researcher's interpretation of the findings of a study using phenomenology is limited to participants' experience and their own interpretations (Patton, 2002). Philosophical hermeneutic identifies the conditions under which a human act takes place or a product was produced that make it possible to interpret. It recognises the mutual creation of reality by both participants and the researcher. The goal of philosophical hermeneutics is to understand what is involved in the process of understanding itself, but not to develop a process to understand a particular phenomenon. Hence, philosophical hermeneutics is concerned with clarifying the conditions under which a phenomenon happens that allow researchers to interpret (Gademer, 1975). Constructionism assumes the relativism of multiple social realities, recognises the mutual creation of knowledge by the participants and the researcher, and aims towards interpretive understanding of participants' meaning of a phenomenon (Guba and Lincoln, 1994). Constructionism refers to constructing knowledge about reality and not constructing reality itself (Patton, 2002).

The subjective nature of this research involves the construction of knowledge by both researcher and participants to develop concepts and a model of how firms create DCs. This study will therefore not be based on participant experience and interpretations of creating DCs alone, because it will involve the construction of knowledge through the researcher's invention of concepts and a model to explain a process in the firms. Further, this study will focus not only on clarifying the conditions why DCs are created, but rather to identify and construct knowledge to understand the whole 'process' of DC creation. This will involve the conditions, participants' meanings, and the researcher's interpretation of knowledge of the process of creating DCs. Therefore for the interpretation of the findings of this study, the constructionism philosophical perspective was found to be more appropriate to the aim of developing a theory than phenomenology and philosophical hermeneutics.
According to Denzin and Lincoln (2000: 197), “Constructionism means that human beings do not find or discover knowledge so much as we construct or make it. We invent concepts, models, and schemes to make sense of experience, and we continually test and modify these constructions in the light of new experience". Therefore, the interpretation of data in this study is based on the constructionist philosophical perspective. This means that realities will be captured in the form of multiple and intangible mental constructions. This will be dependent on the form and content of the participants’ accounts and the researchers’ interpretation of these through the invention of concepts and a model to understand how the process of creating DCs evolves in firms.

In practice, adopting a constructionist philosophy means studying people in their natural setting. It involves the seeking of meanings from both the viewer and the viewed (Charmaz, 2000). Hence, in seeking meanings for the phenomenon of developing DCs, firms will be interviewed in their natural setting to enable the researcher to gain depth and understanding in the study. To seek meanings for the process of developing DCs, the researcher will look for multiple views, experience, facts, beliefs, situations and structures on the phenomenon under study (Charmaz, 2000), and that is why this study adopted a qualitative as opposed to a quantitative approach.

3.3 RESEARCH STRATEGY

According to Morgan and Smircich (1980), reality is often seen as a contextual field of information with the researcher being an information processor. In this study, the intention is to map contexts and uncover contextual conditions on a range of issues on the process of creating DCs in firms. To collect the information, a qualitative research strategy was adopted. This implied a subjective epistemology and the ontological belief that reality is socially constructed.

3.3.1 Qualitative Approach Adopted

Qualitative research originated from anthropology and sociology (Kirk and Miller, 1986). Liebscher (1998: 669) posits that "qualitative methods are appropriate when
the phenomena under study are complex, social in nature and do not lend themselves readily to quantification. Qualitative methods are used when understanding the cultural context from which people derive meaning is an important element of a study. Such cultural context is usually not susceptible to quantification and aggregation and is therefore usually ignored in quantitative studies”. This is because qualitative researchers are concerned with the qualities of entities, processes and meanings, which cannot be measured quantitatively and even if they be so measured, it will be in terms of the quantity, amount, intensity or frequency, and not the meanings ascribed to the phenomenon (Denzin and Lincoln, 2000).

For this research, the emphasis was on a process of creating DCs and this involves looking at how they are created rather than outputs and outcomes of using them. Patton (2002: 159) maintains that “qualitative inquiry is highly appropriate for studying process because depicting the process requires detailed description of how people engage with each other, the experience of process typically varies for different people so the experience need to be captured in their own words, process is fluid and dynamic, so it can’t be fairly summarised on a single rating at one point in time, and participants’ perceptions are a key to process consideration”. Studies on process of firms aim at understanding the internal dynamics of how firms operate. To understand this process requires collecting participants’ perceptions of how the process is organised and managed. According to Denzin and Lincoln (2000: 8): “qualitative researchers stress the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry”. Hence, qualitative inquiry is most appropriate for this type of studies because it examines the intrinsic meanings of the process of the phenomenon under study.

The intent of qualitative researchers is to understand a particular social phenomenon: an event, role, group, or interaction (Creswell, 2003). Researchers use qualitative research to investigate social phenomena, gradually making sense of them by contrasting, comparing, replicating, cataloguing and classifying the data of the study (Miles and Huberman, 1994). There are many forms of qualitative enquiry, such as action research, ethnographic research, case studies and the GTM, available to
investigate this social phenomenon. The next section examines the different types of qualitative research methods and the selection of the appropriate form for this study.

### 3.3.1.1 Action research

The term action research (AR) is popularly attributed to the social psychologist Lewin (1946). There are many varying definitions of AR (Palmer and Jacobson, 1971; Agyris et al., 1985; Checkland, 1991; Elden and Chisholm, 1993; Heller, 1993). For example, Heller (1993: 1239) states that "The AR approach... is particularly appropriate for solving problems for which past research has provided at least a starting point and for the time being, a reasonably accepted scientific model supported by evidence. AR can then tests the evidence against the model, refine it, or improve on it". According to Agyris et al. (1985: 45), "Action science is an inquiry into how human beings design and implement action in relation to one another. Hence, it is a science of practice". AR is collaborative in nature, and researchers and business practitioners collaborate to solve a problem in organisations, for example using this method. AR, therefore, is a form of applied research where the researcher attempts to develop results or a solution that is of practical value to the people with whom the research work is being conducted, and at the same time, is developing theoretical knowledge. Through direct intervention in problems, the researcher aims to create practical outcomes while also aiming to extend existing theory in the domain studied.

AR is useful for projects requiring specific knowledge for a specific problem within a specific situation, and is often used as part of the problem solving strategy alongside research (Silverman, 1993). Traditionally, it has been used in organisational development or educational research. AR has been criticised for lacking scientific rigour, and this due to the fact that there are many different existing definitions and methodological details of how action research is conducted (Lau, 1997; Kemmis and McTaggart, 2000), leading to a vague understanding of AR. Further, AR is usually restricted to a single firm, making it difficult to generalise findings or compare findings from different cases, while different researchers may interpret events differently. The personal ethics of the researcher are critical, since the opportunity for direct researcher intervention is always present. Given that this project is not an
applied research (solving a problem within a firm), but a fundamental research to
develop a theory and knowledge, the AR method is unsuitable for this study.

3.3.1.2 Ethnographic research

The ethnographic research emerged from the field of Anthropology through the
contributions of Bronislaw Malinowski (1922). The methodology is no longer
restricted to anthropological studies alone, and is now widely used in management
research. According to Vidich and Lyman (2000: 380) ethnography, is “devoted to
describing ways of life of human-kind...... a social scientific description of a people
and the cultural basis of their people-hood”. The basis of ethnography is that any
human group of people who interact together for a long time develops a culture. The
intent of ethnographic researchers, therefore, is to study the cultures and social
behaviours of individuals who interact together. The most basic method of data
collection is ongoing participant observation and in-depth interviewing, in an attempt
to capture the whole picture of a phenomenon. Ethnographic study is beneficial for
revealing interrelationships among multifaceted dimensions of group interactions,
accounting for the complexity of group behaviours, and providing context for
behaviours (Creswell, 2003). Ethnographic research could be adopted for this study
because it will help the researcher to extract cultural knowledge, and identify actions
and mechanisms that firms use in their day-to-day activities.

However, it is unsuitable for this study, because ethnographic research is time
consuming as it involves prolonged observation of a process from inception to
implementation, which could range from one year and beyond, depending on the
type of phenomenon being studied. Ethnographic research requires very detailed
observational evidence in which the researcher has to be a participant observer.
However, this study is about firm strategy and competitiveness, which is a sensitive
area. Hence, the researcher cannot be a participant observer in all the meetings and
proceedings concerning the strategy-making process of how firms achieve
competitiveness. The quality of the data alone in ethnographic research is
problematic (Lauer and Asher, 1988). This is because few data can lead to false
assumptions about behaviour patterns, and a large quantity of data may not be
effectively processed. The researcher’s first impressions can also bias the data
collection process, because the major part of data collection is based on
observations. Also, it is potentially expensive, and for a student researcher, the resources (time and money) available for this study limit the prospect of using this methodology. Although a good method, the ethnographic approach is not selected for this research.

3.3.1.3 Case studies

Case studies are defined in various ways and a standard definition does not exist. Case studies are used as a way of presenting research or a methodology for undertaking research (Denzin and Lincoln, 2005). In this thesis, case study refers to a method of conducting qualitative research to develop a theory (Eisenhardt, 1989). A case study examines a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities (people, groups or firms). The boundaries of the phenomenon are not clearly evident at the outset of the research, and no experimental control or manipulation is used (Yin, 1984, 1994; Benbasat et al., 1987). Case study is an ideal methodology when a holistic, in-depth investigation is needed (Feagin et al., 1991). Yin (1994: 8) stated that "Case studies are preferred strategy when "how" and "why" questions are being posed, when an investigator has little control over events and when the focus is on contemporary phenomenon within some real-life context". Yin (1994) argues that case study allows an investigation to retain the holistic and meaningful characteristics of real life events such as individual life cycles, firm and managerial processes, neighbourhood change, international relations, and the maturation of industries.

A case study approach is useful in situations of contextual conditions where events being studied are critical, and where the researcher has no control of the events as they unfold (Yin, 1994). Case studies involve an attempt to describe relationships that exist in reality, very often in a single firm. They can be positivist or interpretive in nature, depending on the approach of the researcher, the data collected, and the analytical techniques employed. Reality can be captured in greater detail by an observer-researcher, with the analysis of more variables than is typically possible in experimental and survey research (Yin, 1994).
The case study method was found to be useful to this study because it can be used to
generate theory; however, it was not selected as a methodology. A research to fill
this gap has to develop a theory that could explain the process of creating DCs
through a clearly formulated framework with accompanying theoretical discussion,
which is grounded in data and extant literature susceptible to both theoretical and
empirical examination. Although the case study approach was found to be useful for
this study, its usefulness is limited, because it has been criticised for lack of rigour of
analysis processes for developing theory (Yin, 1994). This is because strategies and
techniques for analysing case study data are generally not well defined (Yin, 1994;
Darke et al., 1998).

3.3.1.4 Grounded theory methodology (GTM)

The GTM is a systematic qualitative research method for the collection and analysis
of data to generate theory, which is capable of furthering our understanding of
behaviour, as reflected in social and psychological facts and phenomena (Chenitz
and Swanson, 1986). The aim of the GTM methodology is to generate a theory that
explains a certain social phenomenon. GTM has been defined in many similar ways
by different researchers, and these are some of the definitions: Glaser and Strauss
(1967: 2) define grounded theory as “the discovery of theory from data
systematically obtained from social research”. Similarly, Martin and Turner (1986:
141) define grounded theory as “an inductive, theory discovery methodology that
allows the researcher to develop a theoretical account of the general features of a
topic while simultaneously grounding the account in empirical observations or
data”. Also, Strauss and Corbin (1998: 12) define grounded theory as “theory that is
derived from data, systematically gathered and analysed through the research
process. In this method, data collection, analysis, and eventual theory stand in close
relationship to one another”. Taylor and Bogdan (1998: 137) also define GTM as “a
method for discovering theories, concepts, hypotheses, and propositions directly
from data rather than from a priori assumptions, other research, or existing
theoretical frameworks”.

From the above definitions of the GTM approach, theory is developed without any
preconceptions of the elements of the theory; rather, the theory emerges from the
data. Thus, the theory that is developed is more likely to resemble reality than a
theory developed by putting together concepts that were based on speculations (Strauss and Corbin, 1998). The theory evolves during the research process itself, and the theory is a result of interplay between analysis and data collection (Glaser and Strauss, 1965; Charmaz, 1983; Strauss and Corbin, 1990, 1998). Any theory developed is therefore 'grounded' in the group's observable experience, but grounded theorists add their own insight into why those experiences exist. So although grounding the concepts in data is the main feature of this method, the creativity of the researcher is an essential ingredient (Strauss and Corbin, 1998).

Grounded theory attempts to reach a theory or conceptual understanding through a stepwise, inductive process of data collection and analysis (Strauss and Corbin, 1990). Therefore GTM can be used as a technique, since researchers collect data and allow relevant theories to be developed from the data. Since this study intends to develop a theory that could explain the process of creating DCs through a clearly formulated framework with accompanying theoretical discussion, which is grounded in data and extant literature susceptible to both theoretical and empirical examination, the GTM was selected for this study. The next section explains the rationale for selecting the GTM.

3.3.1.4.1 Rationale for adopting GTM for the study

The GTM was selected for a number of reasons. First, it is an effective and appropriate way of researching an emerging phenomenon in its own organisational and human context (Van de Ven and Poole, 1989). Second, it is an efficient method of research, because there is a systematic approach to data collection and analysis, and the theory development is driven by data (Glaser and Strauss, 1967). Third, GTM is used to generate theory where little is known, or to provide a fresh slant on existing knowledge. As very little empirical research has been conducted on the process of creating DCs (Keil, 2004; Peteraf, 2006; Easterby-Smith et al., 2006) and 'the concept is poorly understood' (Dougherty et al., 2004: 2), the subject is still at its infancy stage (Newbert, 2007). So it is important to capture the richness and complexity of the unfolding strategic level process of developing DCs in the natural context of the firms, and the GTM provides opportunity to achieve this. Fourth, since firm processes do not lend themselves very well to quantification, especially where there is no developed framework, it is difficult to examine a firm process using
remote empirical materials. For example, a survey technique of data collection alone cannot measure the intrinsic meanings of the process as experienced by the participants. Hence, the GTM approach is appropriate to collect data using tools such as in-depth interviews and theoretical sampling, to achieve the aim of developing a theory of the process of creating DCs. Fifth, GTM contributes to a superior understanding of a phenomenon through the conceptualisations of ideas and patterns of the phenomenon, which are grounded in empirical data and based on multiple indicators and instances (Martin and Turner, 1986; Glaser, 1998) from different sources of data and participating groups. Finally, when used effectively, GTM has the rigour to develop and replicate a theory, which is developed through the use of systematic procedures of data collection and analysis. The next section examines the origins of GTM and how theory is generated using it.

3.4 ORIGIN AND EVOLUTION OF GTM

GTM was originally developed by Glaser and Strauss, and presented in their book The Discovery of Grounded Theory (1967). The development was an attempt to avoid highly abstract sociology and was part of an important growth in qualitative analysis in the 1960s and 1970s. It was also part of a fight against positivism, or ‘Grand Theory’, a term coined by Mills (1959) to refer to sociological theories developed through the use of quantitative data (Goulding, 2002).

The reasons why Glaser and Strauss (1967) wrote the text on the discovery of grounded theory were (1) to provide a methodology for qualitative research with a strong intellectual rationale to develop theoretical analysis, and (2) to encourage new and creative research. This is evident from the statement made by Glaser and Strauss (1967: 7), “We are all trying, through this book, to strengthen the mandate for generating theory, to help provide a defence against doctrinaire approaches to verification, and to reawaken and broaden the picture of what sociologists can do with their time and efforts. It should also help students to defend themselves against verifiers who would teach them to deny the validity of their own scientific intelligence”. GTM investigations therefore involve the researcher’s intent to develop theory based on real-world data that emerge from, for example, observing a group instead of laboratory-based experiment (Glaser and Strauss, 1967; 1980).
The GTM has undergone many transformations since its initial development. Essentially, there has been a split between the two original authors and how they conceptualise and operationalise the methods, which has led to two versions of the GTM: the Glaserian and the Strauss and Corbin approach. The Glaserian approach involves Glaser’s further elaboration of the original works (Glaser and Strauss, 1965, 1967), *Theoretical Sensitivity* (Glaser, 1978), and his numerous publications (1992, 1993, 1994, 1996, 1998, 2001, 2003). The Strauss and Corbin approach includes publications by Strauss (1987) and Strauss and Corbin (1990, 1998). Essentially, the differences between the two versions of GTM are that Strauss and Corbin’s GTM is often viewed as the development of a more procedural approach of the original GTM, with step-by-step guidelines for developing theory, whereas with the Glaserian approach, theory emerges naturally from the analysis with little detailed attention to procedures or guidelines on the collection and analysis of data.

However, it must be emphasised that although there are two versions of the GTM, they are both based on certain principles which are used regardless of the approach one adopts. These are the constant comparison of data to develop concepts and categories; the gradual abstraction of data from the descriptive to theoretical categories that form the basis of explanation of the theory; the use of theoretical sampling; the writing of memos to help track the process; the use of literature to synthesise the emerging categories; and the saturation of data which requires the researcher to stay in the field until no new evidence emerges (Goulding, 2002). The next section now looks at the selection of the appropriate GTM approach for this research.

### 3.4.1 Selection of GTM Approach for Research

It is not the intention in this study to be involved in the ongoing debate between the two authors (Glaser and Strauss), but rather to position the research on one of the two versions of GTM. For this study, the Strauss and Corbin (1998) version of GTM was adopted. The original discovery of GTM by Glaser and Strauss (1967) was also used as a reference because it is the original development of the GTM and the basis upon which the basic principles of the other two versions were developed.
The following are the reasons for adopting the Strauss and Corbin (1998) version of GTM:

(1) The Strauss and Corbin (1990, 1998) approach allows the researcher to identify a specific phenomenon or issue for study, before entering the field. In contrast, Glaser (1992, 1998) selects an area (e.g. organisation or an activity) for study, but the identification of a specific research phenomenon to study is dependent upon the perceptions, factors and researcher, and the specific phenomenon emerges during the research process. In this study, the researcher identified the specific phenomenon to study, hence the Strauss and Corbin (1990, 1998) approach is appropriate.

(2) It is important that the method selected for the research is consistent with the epistemological stance adopted; specifically, the constructionist philosophy. "A constructivist grounded theorist celebrates firsthand knowledge of empirical worlds, takes a middle ground between postmodernism and positivism, and offers accessible methods for taking qualitative research into the 21st century" (Denzin and Lincoln, 2000: 510). Constructionism assumes the relativism of multiple social realities, recognises the mutual creation of knowledge by the viewer and the viewed, and aims towards interpretive understanding of subjects' meanings (Guba and Lincoln, 1994; Schwandt, 1994). The intent of this study is to develop a theory which is a socially constructed interpretation of the data. Hence, it is important to select the most useful GTM approach which would help to achieve this aim and the Strauss and Corbin (1998) approach has been identified as most appropriate for this study. This is because the Strauss and Corbin (1998) version leans more towards the constructionism philosophy than Glaser’s (1998, 2002).

It must however be noted that Charmaz (2000) has criticised both the Glaser (1992, 1998) and Strauss and Corbin (1990) GTM versions as objectivist, suggesting that their philosophical positioning is at times more positivist in nature. She proposes that researchers could conduct constructionist GTM studies to further their knowledge of subjective experience without accepting objectivist assumptions for conducting research (Charmaz, 2000). Glaser (2002), in response to Charmaz (2000) allegations, did not articulate his epistemological beliefs but rather criticised the constructivist approach of Charmaz (2000) as another type of research he calls ‘Qualitative Data Analysis’ (QDA). Strauss and Corbin (1998) had stated that their GTM approach...
(1998) leans more towards constructionism, and this was made evident by their statement that theory is not the formulation of some discovered aspect of a pre-existing reality 'out there'; such a belief is more congruent with positivist research. They argued that truth is enacted and theories are interpretations made from given perceptions (Strauss and Corbin, 1994).

Charmaz’s (2000) criticisms of Strauss and Corbin’s version of GTM are purely based on the formulistic and procedural aspect of the Corbin and Strauss approach (Stern, 1994). However, it must be stated that the formulas and procedures are just guidelines and tools to help one conduct GTM, they are not ritualistic. This is consistent with the Charmaz (2000) statement that constructivist grounded theorist strategies need not be rigid or prescriptive. For this study, the procedures would be used as a learning process rather than following procedures as a dogma in accordance with the statement by Strauss and Corbin (1998: 4) that "our version of qualitative analysis offers a cluster of very useful procedures - essentially guidelines, suggested techniques, but not commandments". Again, using the constructionist grounded theory approach, the researcher will focus on meanings which will further the interpretive understanding of the theory of the process of creating DCs, rather than limiting the theory (Denzin and Lincoln, 2000). From the above, Strauss and Corbin’s (1998) version of GTM is more relevant for this study because it focuses on the subjective interpretation of the social world, and the use of procedures as guidelines and not rigid rules, which aids the development of a mutually constructed theory.

(3) Strauss and Corbin’s (1990, 1998) approach offers a more practical way to conduct grounded theory. According to Strauss and Corbin (1998), their 1998 GTM is geared towards beginners: "This book was conceived as a text for beginning analysts, who often need guidance and structure during the early phases of their research careers" (Strauss and Corbin, 1998: 14). Their version is just a guide and they have emphatically stated that researchers use their procedures as a means or guide to develop theory, and not as a set of regimental rules that have to be followed. According to Strauss and Corbin (1998: 14), "We strongly emphasise that techniques and procedures, however necessary, are only a means to an end. They are not meant to be used rigidly in a step-by-step fashion. Rather, their intent is to
provide researchers with a set of tools that enable them to approach analysis with confidence and to enhance the creativity that is innate, but often undeveloped, in all of us” (Strauss and Corbin, 1998: 14). In contrast, Glaser (1992; 1998) adopts a laissez-faire attitude towards the operation of the GTM. To Glaser, the participant’s world should emerge naturally from the analysis, with little detailed attention to process on the part of the researcher, and hence he criticised Strauss and Corbin’s (1990, 1998) approach as procedural, and suggested that data do not emerge but are forced.

For example, in response to the assertion by Glaser (1992) that the Strauss (1987) and Strauss and Corbin (1990) approach to developing theory is forced rather than emergent, Stern (1994: 220) stated that “Strauss and later Strauss and Corbin’s development of their approach was in response to critics of GTM, as described in the discovery book, who saw it as loose, lacking verification, and tangled description, hence resulted in the modification of the description of grounded theory from its original concept of emergence to a densely codified structured operation”. Further, Strauss and Corbin (1998: 8) had stated categorically that “One must remember that because emergence is the foundation of our approach to theory building, a researcher cannot enter an investigation with a list of preconceived concepts, a guiding theoretical framework, or well thought of design. Concepts and design must be allowed to emerge from the data”. Thus, with Strauss and Corbin’s (1990, 1998) version of GTM, the researcher does not have any preconceived list of concepts nor a theoretical framework which guides the data collection and analysis, but rather the theory emerges from the simultaneous collection and analysis of data.

(4) Tools of recording and transcribing can be used with the Strauss and Corbin (1998) version of GTM whereas, according to Glaser (1998), recording and transcribing of data are unnecessary because the researcher is after concepts and patterns and not precise accounts of interviews. However, this can be too risky because theory is developed through viewing and reviewing of data collected, which stimulates thinking, and further analysis of the data. In addition, the researcher can review recorded and transcribed data to fill in underdeveloped categories of the theory, which would not be possible with the Glaserian approach.
Computer assisted analysis. Glaser (1998) stated that the use of CAQDAS is not necessary, and according to him, these tools create unnecessary restrictions, inhibit researcher's development of skills, and is time-consuming. It must be emphasised that Strauss and Corbin's (1998) approach of GTM recommends the use of these tools. Hence, in this study, the NVivo2.0 qualitative software would be used to assist with the analysis of data to improve the quality of coding and writing of memos, and management of data, and to provide a very fast way of comparing data, freeing time to conduct other activities. It will also provide flexibility of importing and exporting of data to enhance the creativity of the researcher.

3.4.2 Similarities and Differences between GTM and Other Qualitative Methods

GTM is one of the qualitative methods of inquiry, and therefore shares similar characteristics with other qualitative methods for theory generation. For example, qualitative researchers believe in the socially constructed nature of reality, the intimate relationship between the researcher and the participants, and the context within which reality is created (Denzin and Lincoln, 2000). GTM, like other qualitative methods, stresses the collection of data within the context of a phenomenon being investigated, and the use of excerpts of the data as evidence to support the final theory. Again, the sources of data, in-depth interviews and observations for other qualitative research and the GTM are similar. However, it must be noted that GTM has more flexibility, and includes a wider range of sources of data, for example primary data, documentary evidence, secondary data, e-mails and the Internet, in a single study, to enhance the data for theory generation. This is where the difference between GTM and other qualitative analysis methods starts.

Although there are similarities across the methodologies in qualitative research, there are differences between GTM and other qualitative methodologies for generating theory. GTM and analytic induction (the analysis procedure for generating theory in the other qualitative methods) differ in their breadth of purpose, extent of comparisons, the types of data and ideas compared, the sources of data for the theory development, and the writing of the theory. GTM is focused on systematic theory development through extensive coding and constant comparison (Glaser and Strauss, 1967; Strauss and Corbin, 1998). By the nature of the constant comparison method,
there is an in-built, self-correcting factor for the data collection, and ongoing verification of the theory through theoretical saturation (Rennie, 1998). Analytic induction is concerned with generating and proving an integrated and precise theory accounting for specific behaviours (Znaniecki, 1928, 1934; Glaser and Strauss, 1967; Johnson, 1998). GTM, in contrast, is concerned with the generation of many categories, properties and hypotheses, which are not tested (Glaser and Strauss, 1967; Strauss and Corbin, 1998). It is worth noting that, unlike analytic induction, which tests the theories developed, the GTM does not test the theory to ascertain either the universality or proof of the properties of the phenomenon, because theory testing is not part of the GTM (Smelser and Bates, 2001).

Since the GTM does not test the properties of the theory, it does not require very detailed and very precise descriptive data. This is because once the properties of the theory are saturated there is no need to look for further data. In the words of Glaser and Strauss (1967: 104), theories developed through the GTM “only require the theoretical saturation of data—not consideration of all available data nor are the data restricted to one kind of clearly defined case”. Hence, as stated earlier, sources of data for the GTM approach could range from interviews, observations, documentary evidence, e-mails, web pages, and from different cases, not just one specific case or one source of data to saturate the categories of an emerging theory. Analytic induction, however, depends on very detailed and very precise descriptive data from one or two sources which are tested (Glaser and Strauss, 1967; Johnson, 1998; Smelser and Bates, 2001).

The GTM is more rigorous methodologically and more replicable in terms of the processes through which the theories are arrived at (Strauss and Corbin, 1998). Further, with qualitative research, the findings are reported in thick descriptions in line with the study aims and objectives. However, with GTM the developed theory should have conceptual density and meaningful variation which goes beyond thick descriptions (Glaser and Strauss, 1967). The next section discusses what a theory is.

### 3.4.3 What is Theory?

Since GTM aims at developing theory, it is important to understand what theory is. Glaser and Strauss (1967: 3) maintain that:
"The basic tenet of the grounded theory methodology is the development of theory which goes beyond thick description and therefore it is important that the grounded researcher follows the proper guidelines to ensure that the theory developed enables prediction and explanation of behaviour, be useful in the theoretical advances in sociology, be applicable in practice, provide a perspective on behaviour—a stance to be taken towards data, guide and provide a style for research on particular areas of behaviour, and provide a clear enough categories and hypotheses, so that crucial ones can be verified in the present and future research”.

There is an extensive literature on theory. It has been defined in the literature as a set of propositions interconnected to concepts and propositions about the relationships between those concepts (Kaplan, 1964; Kidder, 1981). Hence, theories serve as the basis on which future actions and activities would be conducted. According to Strauss and Corbin (1998: 22):

"Theory denotes a set of well-developed categories (e.g. themes, concepts) that are systematically interrelated through statements of relationship to form a theoretical framework that explains some relevant social, psychological, educational, nursing, or other phenomenon. The statement of relationship explains who, what, when, where, why, how and with what consequences an event occurs. Once the concepts are related through statements of relationship into an explanatory theoretical framework, the research findings move beyond conceptual ordering to a theory”.

Theories also vary from descriptive, explanatory to predictive. Descriptive theories aim at presenting a detailed description of what happens in a particular social context. Explanatory theories explain why things happen in the way that they do. Predictive theories focus on providing a basis for what will happen in the future under similar conditions as the previous ones.

Strauss and Corbin’s (1998) definition indicates that theories developed from the GTM have the attributes of all three types of ‘theory’ explained above. Theories are made up of certain elements which are the conceptual categories and their conceptual properties, dimensions, and the hypotheses or generalised relations among the categories and their properties (Glaser and Strauss, 1967). A theory is more than a set of findings; it offers an explanation about a phenomenon and this leads to the development of a field of knowledge, and that field of knowledge can be extended through qualitative or quantitative methods (Strauss and Corbin, 1998). For example, in studying the process of creating DCs, recruitment was partly used to explain HRAs for developing DCs in the two participating firms. This concept of recruitment
may have general applicability beyond the two firms studied, and may prove a valuable concept for explaining a similar phenomenon in another firm. Glaser and Strauss (1967), May (1996) and Strauss and Corbin (1998) posit that theories should be dense, that is, the concepts developed should hang logically together as a whole, hypotheses and propositions should be clearly stated and interrelated, and supported by data. Finally, theory should lend itself to new insights of the phenomenon under study.

3.4.3.1 Substantive and formal theories

In GTM, theories developed are classified into two main types: formal and substantive (Glaser and Strauss, 1967; Strauss and Corbin, 1998). Glaser and Strauss (1967: 32) stated that, “By substantive theory we mean that developed for a substantive, or empirical, area of sociological inquiry, such as patient care, race relations, professional delinquency, or research organisations”. Hence, a substantive theory is a theory that is generated from work in a specific area or with a specific group, and does not attempt to explain issues outside its immediate focus of study nor does it try to generalise with explanations of situations for which there are no data (Glaser and Strauss, 1967; Goulding, 2002).

According to Glaser and Strauss (1967: 32), “By formal theory we mean that developed for a formal, or conceptual, area of sociological inquiry, such as stigma, deviant behaviour, formal organisation, socialisation, status congruency, authority and power, reward systems, or social mobility”. A formal theory is a one that has a wider applicability to a range of disciplinary concerns and problems. It is less specific to a group or a place, and it is generated through researching a phenomenon under a variety of conditions (Glaser and Strauss, 1967; Strauss and Corbin, 1998; Goulding, 2002). Although both theories are derived from data, they have some differences. The two theories differ first on the level of generality, which is the degree to which each type of theory can be generalised. Whilst formal theories have higher-level generality, substantive theories tend to be limited to their substantive areas (Glaser and Strauss, 1967). Secondly, the strategies for arriving at each theory vary; hence the researcher has to select which of the two theories the research is focused on.
This study seeks to generate a substantive theory of the process of developing DCs. Therefore the data analysis in this research focused on only one substantive area of the DC concept, which is how DCs are created. The process of creating DCs is only one substantive area of the concept of DCs; there are other substantive areas such as the nature of DCs, and the role of DCs and performance of firms. The substantive theory in this study will be achieved through constant comparison of data between and amongst groups within the same substantive area; in this case, the researcher will conduct a constant comparison of data between participants within Rolls Royce and Sage plc on the process of developing DCs (Glaser and Strauss, 1967; Strauss and Corbin, 1998). In contrast, if this research is focused on developing a formal theory, it will be achieved through the constant comparative analysis among different kinds of substantive cases which fall within the formal area of DCs (Glaser and Strauss, 1967).

Formal theories are developed from either collecting data from all the other substantive areas or using various theories already developed in the substantive areas (Glaser and Strauss, 1967). However, since the DC concept is still not well established (Williamson, 1999; Priem and Butler, 2001), the substantive areas of the concept are also not well developed. Thus, to develop a formal theory implies collecting data from all the different substantive areas of the DC concept. This is a very extensive research for a PhD project, considering the resources (time and money) available. The next section examines how theory is generated through the GTM.

3.4.4 Generating Theory

Generating theory using GTM entails a systematic collection of data through different sources (field observations, interviews, documentation, e-mails), and analysis through a series of coding (open, axial and selective coding) to identify concepts emerging from the data, with the intent of developing core categories that explain the theory. The extensive coding process is conducted, first, to arrive at systematically derived core categories that become the central concepts which contribute to theory development, and secondly, with a view to making the concepts 'dense' and 'saturated'. The theory is then generated through the selection of one or more core categories with their properties which explain the phenomenon being
studied. There are certain basic tenets of the GTM which have to be followed to develop theory, irrespective of the type of GTM version adopted. The basic tenets make up the process of conducting research using the GTM, and these are theoretical sampling, constant comparison, simultaneous analysis and data collection, memo writing, use of literature, and theoretical saturation (Goulding, 2002). The following sections explain these basic tenets of the GTM in detail.

3.4.4.1 Theoretical sampling

With the GTM approach, data are collected through theoretical sampling. Theoretical sampling is a method of collecting data that is theoretically relevant to the emerging theory of the phenomenon under study. Strauss and Corbin (1998: 201) define theoretical sampling as "data gathering driven by concepts derived from the evolving theory based on the concept of "making comparisons," whose purpose is to go to places, people, events that will maximise opportunities to discover variations among concepts and to densify categories in terms of their properties and dimensions".

Theoretical sampling is conducted on the basis of the emerging concepts with the aim of exploring the dimensional range or varied conditions along which the properties of a theory might vary (Strauss and Corbin, 1998). Comparison groups are selected based on their theoretical relevance for the development of emerging categories. Therefore, the researcher selects groups who would help generate to the fullest extent as many properties of the categories as possible, which assist to relate the categories and their properties to each other (Glaser and Strauss, 1967).

Theoretical sampling therefore cannot be predetermined as with other sampling methods used in other qualitative and quantitative studies. The number of people or groups interviewed is not known until the end of simultaneous data collection and analysis, specifically when there is theoretical saturation, when any additional data collected do not bring any new categories and concepts into theory. Theoretical sampling can be said to be purposeful sampling because participants are selected based on emerging concepts and theory. However, unlike the purposeful sampling in other qualitative and quantitative research, which is carried out before going into the
field, the purposeful sampling in GTM is only possible during the process of data collection and analysis.

### 3.4.4.2 Constant comparison and theoretical comparison

The GTM data collected from the field are analysed using the constant comparative method (Glaser and Strauss, 1967) and theoretical comparisons (Strauss and Corbin, 1998). Theoretical comparisons are tools for looking at something somewhat objectively rather than naming or classifying without a thorough examination of the object at the property and dimensional levels (Strauss and Corbin, 1998). The basic tenet of the constant comparison method is that whilst coding an incident, event or a happening for a category, it is compared with the previous incidents in the same and different groups coded in the same category (Strauss and Corbin, 1998). The GTM advocates ongoing simultaneous data collection and analysis, and this in turn directs the type of data to be collected and participants to be interviewed. Unlike other qualitative analysis, each piece of data collected should be analysed before the next data collection episode.

The constant comparison method consists of four stages: (1) open coding, comparing incidents applicable to each category, (2) axial coding, integrating categories and their properties, (3) selective coding, delimiting the theory, and (4) writing the theory. The constant comparison method is used jointly with theoretical sampling to collect and analyse data that are theoretically relevant to the emerging theory. The elements of the theory are generated through comparative analysis of the conceptual categories and their conceptual properties and hypotheses or generalised relationships among the categories and their properties. The hypotheses are developed through relational statements from the grounded data (see Chapter 5) (Glaser and Strauss, 1965; Strauss and Corbin, 1998).

According to Glaser and Strauss (1967), the constant comparative method cannot be used for both provisional testing and discovery of theory. This is because with theoretical sampling, the data collected are not extensive enough, and due to theoretical saturation are not coded enough to yield provisional tests as the analytic induction. They are only coded to generate theory. Partial testing of theory, when
necessary, is left to more rigorous approaches, sometimes qualitative but usually quantitative.

3.4.4.3 Use of literature

It is commonly held that GTM does not encourage literature review during the initial stages of research (Goulding, 2002). Although GTM requires that the researcher enters into the field with relatively limited knowledge of the problem under investigation, it is not necessarily the case that no literature review is conducted during the initial stages (Goulding, 2002).

Reviewing the literature in the initial stages of the research is important. However, it should only be conducted in other substantive areas of the phenomenon (DCs) rather than the research focus (the process of creating DCs at the strategic level). Undertaking an initial literature review in other substantive areas rather than the main focus of the study is to give the researcher ideas and to conceptually connect these to the developing theory in order to enhance theoretical sensitivity. However, the actual literature review is conducted when the categories and concepts of the theory emerge during data collection and analysis. The rationale for delaying literature review in the substantive area is to avoid the researcher bringing in preconceived concepts and designs before they emerge from the data (Strauss and Corbin, 1998; Goulding, 2002). As stated by Goulding, (1998: 53), "Such related work is analysed in order to draw comparisons, build on, or offer an alternative perspective". Therefore the literature reviewed is used as a source of data or critique of the emerging theory.

3.4.4.4 Writing memos

Memo writing serves as a link between coding and the first draft of the completed analysis in the GTM approach. "Memos refer to specialised written records - those that contain products of analysis or directions for the analyst. They are meant to be analytical and conceptual rather than descriptive" (Strauss and Corbin, 1998: 217). They are made up of theoretical questions, coding summaries, and hypotheses. These help to stimulate and encourage the thinking of the analyst during coding, to define leads for collecting more data, and to serve as a basis for theory integration and
generation (Denzin and Lincoln, 2000). Memos are used to reflect upon and explain meanings ascribed to codes by a researcher, to identify relationships between codes, to clarify, sort and extend ideas, and to record crucial quotations or phrases (Douglas, 2003).

Memos are written continuously throughout the entire research analysis process from open coding, axial coding to selective coding. Memos may vary in type and form: (1) code notes are memos containing the actual products of the three types of coding (open, axial and selective), (2) theoretical notes are memos that contain an analyst’s thoughts and ideas about theoretical sampling and other issues, (3) operational notes are memos containing procedural directions and reminders and sub-varieties of these (Strauss and Corbin, 1998). It is important that the researcher distinguishes between the different types of memos written because each has a function to play in the analysis process (Strauss and Corbin, 1998). The researcher uses the content of the memos to write the final theory.

3.4.4.5 Theoretical saturation

Strauss and Corbin (1998: 143) define theoretical saturation as “the point in a category development at which no new properties, dimensions, or relationships emerge during analysis”. The GTM approach espouses that to develop a theory, the researcher must ensure that constant comparison is continuous and theoretical sampling directs the next source of data to ensure that all categories for the theory are saturated. Theoretical saturation occurs when new data collected provide no evidence or have no explanatory power for the emerging theory (Glaser and Strauss, 1967; Strauss and Corbin, 1998; Goulding, 2002). There is no hard and fast rule on when theoretical saturation occurs, but it is important that the researcher ensures that the categories are saturated for the theory to have substance (Glaser and Strauss, 1967; Strauss and Corbin, 1998). To ensure theoretical saturation, the researcher must collect a wide range of data on a phenomenon. With the diversity of a wide range of data, there may be recurrence of similar incidents and events which would give the researcher the confidence that the data are saturated.
3.4.4.6 Writing theory

There are no particular styles for writing the GTM theory. According to Glaser and Strauss (1967: 115), "The constant comparative method can yield either a discussonal or a propositional theory. The analyst may wish to cover many properties of the categories in his discussion or to write formal propositions about a category. The former type of presentation is often sufficiently useful at the exploratory stage of theory development, and can easily be translated into propositions by the reader". Hence, the write-up of the substantive theory can take the form of an extensive theoretical discussion of a theoretical framework, using conceptual categories and their properties and dimensions, and its associated theoretical statements, as evidence for conclusions or may involve a well-codified set of propositions. Glaser and Strauss (1967) also maintain that the researcher provides only enough data to facilitate understanding and also ensures that the reader understands the overall theoretical framework and its principal associated theoretical statements.

In this regard, Glaser (1978) posited that it is not incumbent upon the researcher to provide the reader with a description of how every concept was reached, but rather the method should be stated and incorporate examples of how a concept was reached. The researcher can also quote from the interview data to support the concepts and categories. Again, it is important to present the data with analytical comments, using the coding and memos with carefully selected theoretical words. This, according to Strauss (1987), creates a sense of reality and helps the reader to understand the theory in a much better way of how it evolved.

Further, the standard approach in GTM is to present the data as evidence for conclusion; however, because qualitative data do not lend themselves easily to summary, the researcher has to incorporate illustrations and diagrams to aid understanding of the theory. When writing the theory, the researcher should incorporate extant literature either as a source of data integrated into the data or as a critique of the data. The findings presented in the GTM theory are suggested propositions or hypotheses. This is because all the concepts that are used in the framework are grounded in data and thus have not been proven. This is in accordance with the statement made by Glaser and Strauss (1967) that GTM, unlike
other inductive qualitative research methodology, only generates theory but does not test the theory that has been developed. So the theories developed are abstract and not tested.

3.5 SUMMARY

In this chapter, a detailed account of the research design was presented. The first part of the chapter examined the philosophy that the research adopted. The two major philosophies, positivism and interpretivist philosophy were examined. The rationales for selecting the constructionist philosophy for interpreting the data were explained. The second part of the chapter then explained the qualitative research inquiry and why the GTM was selected for the research. Further, the chapter presented in detail the discovery, nature and type of GTM adopted, the differences between GTM and other qualitative methods, and how theory is generated through the GTM.
CHAPTER 4  DATA COLLECTION AND MANAGEMENT

4.1 INTRODUCTION

This chapter presents the data collection and management approach of this study. The chapter examines data collection tools, the interview style, the interview structure, the site selection process, a brief background of the sites used, and the selection of the target sample. It also explains the main data collection process. The second part of the chapter discusses the data management procedures and explains the computer-assisted qualitative data analysis software (CADAQS) used to assist in the management of the data.

4.2 DATA COLLECTION TOOLS

Outhwaite (1987) stated that the conception of the object of inquiry would crucially determine the sorts of tools that are appropriate for investigations. Based on the constructionist philosophy (see Table 3-3) and the GTM, the qualitative data collection tools that could be used for this study are observations and in-depth interviews (Denzin and Lincoln, 2000; Goulding, 2002). Observations involve listening and observing other people's behaviour, which allows some type of learning and analytical interpretation of that behaviour (Ghauri and Gronhaug, 2005). Observations can be participant when researchers become part of the natural setting and the people they observe, or non-participant when a researcher observes people without becoming part of that natural setting (Denzin and Lincoln, 2000; Ghauri and Gronhaug, 2005). In-depth interviews involve real interaction between the researcher and participants which can be done through face-to-face, by sending questionnaires through the mail (post/e-mail), and conducting interviews on the telephone, to obtain information about a phenomenon (Denzin and Lincoln, 2005; Silverman, 2005). There are three types of interview: structured, semi-structured and unstructured interviews (Denzin and Lincoln, 2000).

The choice of a particular tool of data collection is influenced by the research problem, research design, researcher skills, and the nature of the participants in the
study (Ghauri and Gronhaug, 2005). The structure of the method for collecting data in a constructionist perspective should be flexible to ensure the emergence of private thoughts, feelings and experience to be captured about the phenomenon of developing DCs (Outhwaite, 1987). The research problem in this study is to identify and explain how firms create DCs, which could be retrospective and introspective. Again, the process of creating DCs is a sensitive area of the business because it borders on strategy formation, trade secrets, and competitiveness of firms. The research design of the study is exploratory because little is known about the process of creating DCs at the strategic level. Hence, the researcher requires an effective data collection tool to identify and explain how firms do this. Observing the process alone would not assist the researcher to uncover all aspects of process, and the information gathered will be from the researcher's perspective alone. Further, it will be difficult to be part of or to observe the strategy formation meetings due to the sensitive nature of the process of creating DCs.

4.2.1 Primary Research Tool: In-depth Interviews

Therefore, for this study, the in-depth interview tool is adopted for data collection. According to Outhwaite (1987), qualitative methods such as in-depth interviewing are the most useful for social enquiry since common sense descriptions of social phenomena must be taken as the starting point for social scientific theorising. The in-depth interview method was deemed an appropriate and effective way to understand how firms create DCs, because it will assist the researcher to gain a more accurate and clear picture of participants' position on the process of creating DCs than just observing. The researcher can probe further into answers given by participants without any constraints to further enhance the findings on the process of creating DCs. The next section looks at the three different types of interviews.

4.2.1.1 Selection of unstructured and semi-structured interview approach

To select the appropriate interview approach for this study, the three different types of interviewing: structured, semi-structured and unstructured, were analysed. With the structured interview approach, the interviewer asks all the respondents the same series of pre-established questions with a limited set of response categories. Although this type of interview is focused and systematic, there is little room for
variation in the responses, except when there are open-ended questions (Denzin and Lincoln, 2000). Also, coding of this type of interviewing is done according to a pre-established coding scheme which would have been an obstacle to this research process because it negates the very essence of what GTM is about; that is, themes and concepts should emerge from data and not be preconceived before the field study. Since there were no predefined categories on the process of developing DCs, it was not possible to use the structured interviewing approach.

The semi-structured interview approach is a guided interview with broad areas of the questions or topics that are asked, which do not constrain the interview and allow new questions to emerge during it (McMillan and Schumacher, 1993; Flick, 1998; Denzin and Lincoln, 2005). A semi-structured interview is an informal, relaxed discussion, based around a predetermined topic or questions. These sets of questions prepared in advance are not rigid but rather open, which allows the participants to express opinions, feelings and perceptions.

The unstructured interview approach has no predetermined set of questions and it is usually appropriate under many emergent fields, especially if the researcher does not know what is going to happen in the field (Patton, 2002). Data gathered in this approach may be different for each participant interviewed. Interview questions change over time and each new interview builds on previous ones, expanding on information that was picked up previously and seeking elaborations from participants.

From the analysis, the unstructured and semi-structured interview tools were selected for this study. According to Goulding (2002), the unstructured interview is favoured for GTM because it has the potential to generate rich and detailed accounts of the individual’s experience. The unstructured and semi-structured interview methods of data collection were selected because they have greater breadth of data than other types (Denzin and Lincoln, 2000; Fontana and Frey, 2000), and provide rich insights into people’s aspirations, opinions, experience, attitudes and feelings (May, 1997). They are flexible enough to allow discussion to lead into other areas which were not considered prior to the interview, but which are potentially relevant to this study. However, with these interviews, because the questions are not structured, these could lead to researcher effects such as leading questions and biases. It is also difficult to
analyse the data from this kind of interview to identify patterns that have emerged from different participants (Patton, 2002). To reduce the limitations of the unstructured and semi-structured interview, the researcher should act on the following: define the researcher’s role in the research process, establish rapport with participants, have excellent interpersonal skills, and avoid asking leading questions (Denzin and Lincoln, 2005; Silverman, 2005).

4.2.2 Secondary Research Tools

The GTM encourages a wider range of data sources for developing theory, hence it was appropriate to search for relevant literature and company information, apart from the documents and data received directly from the participating firms. The researcher employed secondary tools to collect data, specifically company reports, academic literature, and e-mails. Company annual and project reports were used as sources of information. Academic literature was used as a source of data and a critique of the theory developed. The e-mail, on the other hand, was used to target potential participants for the study and to follow up from the interviews.

4.3 THEORETICAL SAMPLING: SITE SELECTION AND ACCESS

In GTM, two types of theoretical sampling are conducted: an initial selection of the sites, and based on the initial data collection and analysis pertaining to the sites selected, participants are selected in relation to the emerging theory (Glaser and Strauss, 1967; Strauss and Corbin, 1998). According to Mason (1996: 93-4), "Theoretical sampling means selecting groups or categories to study on the basis of their relevance to your research questions, theoretical position and most importantly the explanation or account which you are developing. Theoretical sampling is concerned with constructing a sample which is meaningful theoretically, because it builds in certain characteristics or criteria which help and test your theory and explanation". It is imperative, therefore, that the sites for this research are chosen with great care to ensure their relevance to the phenomenon of creating DCs at the strategic level.
The sites for this study were selected through theoretical sampling based on their theoretical relevance to the research question of how DCs are created at the strategic level. From the literature review in Chapter 2, the features of DCs were identified; hence, the sites were selected based on their characteristics that exhibited some features of DCs. The criteria for selection included firms operating in highly changing business environments, which are unpredictable and experience technological changes. The final criterion was good performance\(^8\) (Teece et al., 1997; Eisenhardt and Martin, 2000). Using the Hemscott Company Guru\(^9\), an initial twenty firms which met some of the criteria set out above were selected. All the firms selected for the study were firms with good performance in their markets. As stated by Yin (1989), the principle of theoretical sampling espouses that cases (sites) are selected to serve specific purposes: (1) to fill theoretical categories, to extend the emerging theory, and/or (2) to replicate previous case(s) (sites) to verify the emerging theory, or (3) a case that is a polar opposite to extend the emerging theory. In this study, the performing firms were selected to aid with replication, i.e. finding replications of the components of the process of creating DCs at the strategic level to verify the emerging theory. Hence, the researcher did not use an opportunistic approach to site selection, that is, using whichever site was available purely on the grounds that it was so.

Glaser and Strauss (1967) maintain that a single site or multiple sites can be selected for a GTM study. The focus of GTM for theory generation is ensuring that the theory has conceptual density and variations (Strauss and Corbin, 1998). Hence, to ensure conceptual density and variations, the researcher decided to use multiple sites, specifically four firms in the technology/communication industry but in different market sectors. According to Glaser and Strauss (1967) and Strauss and Corbin (1998), the generation of theory can be achieved by comparative analysis between

\(^8\) The term ‘good performance’ encapsulates making profits. This does not imply ‘excelling’ or making supernormal profits or achieving dominant market share as this may have introduced problems later on in terms of tautology. However, given that ‘good’ performance was a selection criterion, it did mean that companies making losses and so forth were excluded from the potential sample. This is recognised as a limitation of this research.

\(^9\) Hemscott Company Guru is an online database that provides in-depth analysis and financial data for 300,000 of the UK’s top public and private companies, with detailed information on company fundamentals, industry sectors, share prices, charts, ratios, latest news, and detailed information on directors.
participants in the same group or among different groups, hence the comparison of different firms in the same technology/communication industry but in different markets. The rationale for selecting different groups was the ability of the comparative groups to generate more concepts, properties and dimensions to enrich and enhance the theory being developed on the process of creating DCs at the strategic level (Glaser and Strauss, 1967; Strauss and Corbin, 1998).

The researcher selected twenty firms which met the criteria set above with a 20% response rate in mind (cf. Menon et al., 1999). This would provide four firms. Sampled firms were located in the UK for access reasons and ease of data generation. To gain access to the firms to conduct this research, the selected firms were sent introductory letters by post addressed to the CEO. The introductory letter presented the purpose and aims of the research (see Appendix A). This was followed up with a telephone call after three days to enquire about the letter. Three of the firms said that they had not received it, so a copy was sent to each of them once more. Out of the twenty firms, fourteen declined to participate in the research with reasons ranging from firm policy not permitting them to take part in the research, the research bordering on their competitive advantage, to executives and middle level managers who were too busy to participate. Two others did not respond at all. Several telephone calls were made to one of the firms, BT Group, but it did not respond to the letter nor did it opt out of the research. Three firms (Sage, Marconi Corporation and Rolls Royce) agreed to participate. However, Marconi Corporation opted out of the research at a later stage in the project.

This research therefore focused on two firms: Sage and Rolls Royce. Both operate in the high technology industry but in different sectors (software and manufacturing/engineering) and markets.
4.4 BRIEF BACKGROUND OF TWO PARTICIPATING FIRMS

This section provides a brief background of the two sites used in the study, focusing on their vision and mission statements, key strategies, business sectors, products, and performance (see Appendix D).

4.4.1 Rolls Royce plc

Rolls Royce is a global firm providing power for use on land, at sea and in the air. The firm has a balanced business portfolio with leading positions in civil and defence aerospace, marine and energy markets. This study focuses on Rolls Royce UK. The vision and the mission statements of Rolls Royce are: “Trusted to deliver excellence” and “To be trusted to deliver excellence to our customers and investors with the support of employees and partners and suppliers”.

The key strategies of Rolls Royce to achieve its vision and mission as stated are as follows:

1. To address four global markets, in civil and defence aerospace, marine and energy.
2. To invest in technology, capability and infrastructure. Over the last five years, Rolls Royce has invested more than £3 billion in R&D, creating advanced technologies that are employed across its product range. It invests around £30 million each year in training and developing its people. It continues to invest in new and more efficient production facilities, as well as repair and overhaul facilities around the world as its customer base grows. By investing in the best engineering skills and innovation, supported by a steady programme of plant building and refurbishment, Rolls Royce has developed a portfolio of competitive products.
3. To develop a competitive portfolio of products and services. Rolls Royce’s strong product portfolio has ensured that it is involved in many of the major future projects in the markets it serves. These key projects, ‘Trent’ to power new Airbus and Boeing airliners, confirming it as the world’s leading large aero-engine family, the world’s most powerful aero-derived gas turbine, the industrial Trent, the world’s most powerful marine gas turbine, the MT30,
and the global leadership in military transport power continues with the TP400 development, which will shape the power systems market for the next 50 years.

4. To grow market share and installed product base. Rolls Royce has 54,000 gas turbines in service, delivering power for land, sea and air applications. It powers 42 of the top 50 airlines and 160 defence customers. 70 navies and 2,000 commercial customers use its marine products, and its energy systems are used in 120 countries.

5. To capture substantial after-market opportunities. Its wide portfolio of products has led to a steady expansion in its market share, with a growing number of Rolls Royce engines in service. The resulting expansion in its after-market services is making a growing contribution to its business. It is investing significantly in support capabilities that will add value for its customers while adding predictability to its own future earnings.

Rolls Royce is a technology leader, employing 36,200 people and operating in 50 countries, of which 21,000 are in the UK. 40 per cent of its employees are based outside the UK, including 5,000 in the rest of Europe and 8,000 in North America. Rolls Royce has offices, manufacturing sites or service centres in 50 countries around the world.

Rolls Royce also has a broad customer base comprising more than 500 airlines, 4,000 corporate and utility aircraft and helicopter operators, 160 armed forces, and more than 2,000 marine customers, including 70 navies. The firm has energy customers in nearly 150 countries. The reputation of Rolls Royce for producing high-quality products is very precious to the firm but it also holds a firm belief that customers wherever they are in the world, whenever they come into contact with Rolls Royce people, should receive the same high standards of service. This is manifested in their positioning statement, ‘Trusted to deliver excellence’, and this represents what everyone in Rolls Royce is striving to achieve. Rolls Royce builds long-term relationships with its stakeholders, helping them to understand what the company is and its business strategy. Rolls Royce has a reputation as a manufacturer of world-class products, so it is continuously seeking ways to extend this reputation as a complete service solutions provider for its customers.
4.4.1.1 Business sectors of Rolls Royce

Rolls Royce has a rich history and today it is one of the world’s leading producers of power systems for use on land, at sea, and in the air. Rolls Royce operates in four global markets: civil aerospace, defence aerospace, marine, and energy. Table 4-1 shows the product and market range of Rolls Royce.

Table 4-1 Rolls Royce Markets and Product Range

<table>
<thead>
<tr>
<th>Markets</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Aerospace: Airlines, regional aircraft, corporate jets and helicopters</td>
<td>Aero engines (gas turbines)</td>
</tr>
<tr>
<td>Defence Aerospace: Combat market, helicopters, transport market, trainer market, tactical and UAV market</td>
<td>Aero engines (gas turbines)</td>
</tr>
<tr>
<td>Marine: Defence market</td>
<td>Deck machinery, design and ship systems, diesel engines, gas turbines, manoeuvring systems, propulsion, stabilisation and technical services</td>
</tr>
<tr>
<td>Energy: Oil and gas, and power generation markets</td>
<td>Oil and gas products, power generation products and automation and control systems</td>
</tr>
</tbody>
</table>

Source: Rolls Royce plc data 2003

4.4.1.1.1 Civil aerospace

Rolls Royce has a broad product range in civil aerospace. The firm provides power for more than 30 different civil aircraft types, for international airlines, regional airlines, and corporate operators. Rolls Royce’s success in aerospace is based on its wide product portfolio and the strength of the gas turbine technology. Rolls Royce’s position in the engine market is established as the world’s number two engine maker overall, number one in large turbofans, and number one in business jets, with annual sales of £3.5 billion in 2005, of which 59 per cent came from services, specifically Total-Care and Corporate-Care service agreements which cover 40 per cent of civil fleet. 500 airlines and 4,000 corporate and utility operators rely on Rolls Royce power, with 11,000 jet engines in service, and spanning business jets to modern wide-body airliners with a thrust ranging from under 2,000 to almost 100,000lb. The Trent series engines have 50 per cent of the wide-body market, and the AE 3007 and BR 700 series engines are strongly placed in regional and corporate jet markets.
4.4.1.1.2 Defence aerospace

The defence business is broadly based, with a strong portfolio of products and services covering the key defence aerospace market sectors. Rolls Royce’s engines power aircraft in all of the major military aviation market sectors, from military transport aircraft and helicopters to trainers and combat aircraft. Rolls Royce is the number one military aero engine manufacturer in Europe, and number two military in the world, powering approximately 25 per cent of the world’s military fleet. Rolls Royce supplies engines to 160 defence customers in more countries (103) than any other manufacturer. Rolls Royce has whole engine design, engineering and manufacturing facilities in the UK (Bristol), Germany (Dahlewitz) and the U.S, (Indianapolis).

4.4.1.1.3 Marine

Rolls Royce marine business is a global leader in marine propulsion, engineering and hydrodynamic expertise, with a broad product range and full systems integration capability. Rolls Royce offers a product portfolio ranging from vessel design and gas turbine engines to water jets and deck handling equipment. The business is unique in its scope and capabilities, with the aim of supplying power, propulsion and motion control systems for high-value vessels. Rolls Royce is the world leader in the marine business, with 7000 employees and 2000 customers, with equipment in over 20,000 vessels and sales in 34 countries. Rolls Royce has its main marine manufacturing centres in the UK, North America and Scandinavia.

4.4.1.1.4 Energy

The energy sector of Rolls Royce’s business focuses on gas turbines with a role from new product development, sales and marketing, manufacturing and assembling to after-market services. The energy sector continues to look for every opportunity to leverage Rolls Royce gas turbine technology in energy markets. In the market, Rolls Royce had supplied more than 5,000 units to customers in nearly 120 countries, and is investing in new products and capabilities for the oil and gas industry and for distributed electricity generation. As a world leading supplier of energy solutions, Rolls Royce can be truly regarded as both a global and local firm. From
manufacturing centres through to overhaul bases, it has presence all over the world. Rolls Royce’s activities reach far beyond gas turbine-based generating sets serving the power generation market. Both onshore and offshore, Rolls Royce gas turbine packages have been serving the oil and gas industry since the 1960s. Rolls Royce also has an excellent reputation for supplying high specification, small land and sea energy solutions for battlefield and naval applications in the defence market through the Rolls Royce Distributed Generation Systems business.

4.4.1.5 Revenue from four market sectors

Rolls Royce is a strong Group with revenues balanced between original equipment sales and high value-added services. Its four business markets are united by common technology focused on the gas turbine. It creates value by investing in technology once, and using it many times. It is investing in technology and capability that can be exploited in each of these sectors to create a competitive range of products. The success of these products is demonstrated by the firm’s rapid and substantial gains in market share over recent years. The firm now has a total of 54,000 gas turbines in service worldwide, and these generate a demand for high-value services throughout their operational lives. The investments in product, capability and infrastructure to gain this market position create high barriers to entry. Table 4-2 below shows details of performance of the four markets sectors in which Rolls Royce operates, as at 2006, which shows that civil aerospace is the main or dominant sector of the group’s operations.

<table>
<thead>
<tr>
<th>Sector Market</th>
<th>Total group sales (M)</th>
<th>% of Group sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil aerospace</td>
<td>£3,775</td>
<td>53%</td>
</tr>
<tr>
<td>Defence aerospace</td>
<td>£1,569</td>
<td>22%</td>
</tr>
<tr>
<td>Marine</td>
<td>£1,300</td>
<td>18%</td>
</tr>
<tr>
<td>Energy</td>
<td>£ 512</td>
<td>7%</td>
</tr>
<tr>
<td>Total</td>
<td>£ 7,156</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Rolls Royce Annual Report, 2006
4.4.1.2 Organisational structure of Rolls Royce

Rolls Royce is managed by an executive group made up of the CEO, Sir John Rose, and eleven executive directors: president civil aerospace, directors of energy, defence aerospace, marine, engineering and technology, finance, human resources, group marketing, procurement, operations, and president Rolls Royce North America. The group works on broad objectives set out by the board of directors. The Board currently comprises a non-executive chairman, a chief executive, five other executive directors and eight non-executive directors.

Rolls Royce operates a matrix organisational structure. The matrix structure comprises two key business streams: the operating business units (OBUs) which include the main operating units: the fan, compression, combustion, turbines and controls systems, and transmission structures (these are the major elements of the gas turbine engine), and they interface with the customer-facing business units (CFBUs): civil aerospace, defence aerospace, energy and marine.

The job of each of these CFBUs is to define and integrate products that it can offer to meet customer requirements. However, to put these products together components are needed, and the OBUs supply them to the CFBUs. The CFBUs then pull together the components into a whole engine, test the engine, and once it is developed through testing, supply it to the customers. In addition to the components that the OBUs produce, the firm’s control and purchasing units bring in other parts of the components from outside suppliers which are fed into the OBUs, and from the OBUs fed into the CFBUs. So there is always networking between the different business units in the firm. Also, across the various business units there are certain functions: human resource, quality, and health and safety, which help to coordinate and ensure that all the business units have a common strand, a common message, a common purpose, and common ways of working across the entire firm. Figure 4-1 shows the organisational structure of Rolls Royce.
Figure 4-1  Organisational Structure of Rolls Royce plc

Company structure

CUSTOMER FACING BUSINESSES

Civil Aerospace
- Airlines
- Corporate

Defence
- Defence (Europe)
- Defence (NA)
- Helicopters

Marine
- Commercial Marine
- Naval Marine

Energy
- Oil & Gas
- Power Generation

OPERATIONS BUSINESS UNITS

Fan Systems
Compressor Systems
Combustion Systems
Turbine Systems
Transmissions & Structures
Control Systems
Indianapolis Operations

Group Executive
- Chief Executive
  - Director: Operations
  - President: Rolls Royce NA
  - Director: Finance
  - Director: Engineering & Technology
  - Director: Group Marketing
  - Director: Procurement
  - Director: Human Resources
  - President: Civil Aerospace
  - President: Energy
  - President: Marine
  - President: Defence

Support to Group Executive
- Corporate Development
- Company Secretariat
- General Counsel
- Corporate Communications
- Director of e-Business

Source: Rolls Royce Data, 2003
4.4.1.3 Financial performance of Rolls Royce

Rolls Royce has performed consistently for the past ten years. In 2006, it increased its operating revenue from £6.6 billion in 2005 to £7.2 billion, and lifted its underlying profits before taxation from £679 million in 2005 to £705 million in 2006. There was also a strong cash flow performance: it generated a cash inflow of £491 million. Net cash balance rose from £335 million in 2005 to £826 million in 2006. Average net debt also reduced from £260 million in 2005 to £150 million in 2006, which was at its lowest level since 1998. Across its four operating businesses, it has booked £26.1 billion of orders into the order book. This order book has now grown in each of the past ten years at a 12 per cent compound annual growth rate. Solid progress was made across all four of the Group’s target markets: in civil aerospace, the Trent 1000 engine was adopted by Boeing for its new 787 Dreamliner programme, and was selected for the purchase of 50 aircraft by Nippon Airways, ensuring that Rolls Royce will be the launch engine for this programme. Rolls Royce performed strongly in 2006, with its underlying earning per share rising from 24.4p in 2005 to 29.81p in 2006. Rolls Royce has two sources of revenue: original equipment sales and after-market sales; in 2006, the after-market sales were 53 per cent, whilst original equipment sales were 47 per cent of total revenue. After-market sales have increased consistently over the past five years. Figure 4-2 below shows the consistent progress in the performance of Rolls Royce over the past ten years.

A key element of the firm’s strategy is to maximise services revenues, which have increased by 60 per cent over the past five years, through the provision of a comprehensive portfolio of services. Annual sales total £7.2 billion, of which 53 per cent is service revenue. The order book is more than £26.1 billion, which together with demand for services, provides visibility as to future activity levels. These and other successes during the year 2006 ensured that Rolls Royce continued to enhance its strong market position in each of its four chosen sectors. Despite some challenging market conditions, the evidence from the 2006 preliminary annual report shows that Rolls Royce remains highly competitive in its operating markets.
Figure 4-2  Yearly Financial Performance Rolls Royce plc

Sales

<table>
<thead>
<tr>
<th>Year</th>
<th>£bn</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>4.3</td>
</tr>
<tr>
<td>1998</td>
<td>4.5</td>
</tr>
<tr>
<td>1999</td>
<td>4.6</td>
</tr>
<tr>
<td>2000</td>
<td>5.9</td>
</tr>
<tr>
<td>2001</td>
<td>6.3</td>
</tr>
<tr>
<td>2002</td>
<td>6.8</td>
</tr>
<tr>
<td>2003</td>
<td>5.6</td>
</tr>
<tr>
<td>2004</td>
<td>5.9</td>
</tr>
<tr>
<td>2005</td>
<td>6.6</td>
</tr>
<tr>
<td>2006</td>
<td>7.2</td>
</tr>
</tbody>
</table>

Headline sales

Compound growth of 6% pa over past 10 years

Services revenues

<table>
<thead>
<tr>
<th>Year</th>
<th>£bn</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>1.7</td>
</tr>
<tr>
<td>1998</td>
<td>1.8</td>
</tr>
<tr>
<td>1999</td>
<td>1.9</td>
</tr>
<tr>
<td>2000</td>
<td>2.2</td>
</tr>
<tr>
<td>2001</td>
<td>2.4</td>
</tr>
<tr>
<td>2002</td>
<td>2.5</td>
</tr>
<tr>
<td>2003</td>
<td>2.8</td>
</tr>
<tr>
<td>2004</td>
<td>3.3</td>
</tr>
<tr>
<td>2005</td>
<td>3.5</td>
</tr>
<tr>
<td>2006</td>
<td>3.9</td>
</tr>
</tbody>
</table>

Compound growth of 10% pa over past 10 years
Growing order book
10% compound annual growth over last 5 years

Total sales: £7.4bn
Aftermarket services: 53% (£3.9 bn)
Energy: 4%
Marine: 11%
Defence: 10%
Original equipment: 47% (£3.5bn)
Civil: 22%

Source: Rolls Royce Preliminary Annual Report, 2006
4.4.2 Sage plc

Sage was established in 1981 in Newcastle upon Tyne as a small software firm, which has grown rapidly to become the world’s leading supplier of business management software and related services to small and medium-sized enterprises (SMEs). Sage is a world-leading supplier of accounting, payroll, retail and CRM software for small and mid-market firms, as well as specialist applications for manufacturing, construction and accountants in practice. Sage has grown through acquisition, selecting those firms and partners who most exemplify the innovative spirit, customer loyalty and established products that customers desire. Through acquisitions, Sage has developed a complement of products and services designed to meet specific needs within its selected industries. The vision statement of Sage is: “The power of one company truly devoted to the needs, challenges and dreams of our customers”, and its mission statement: “To be the leading supplier of business management products and services to small and medium-sized customers”.

The firm’s strategy to achieve its vision and mission is focused on the following areas:

1. To present one face to all customers and partners. The key strength of the firm is the ability to offer its customers a broad selection of applications most suited to unique needs and industries. No matter where or how customers contact Sage, they receive the same service to meet their specific requirements.

2. Sage, in order to expand its expertise and broaden its offerings to meet the growing needs of customers, targets the best acquisitions which enable complementary business strengths, share common experience, and pursue collective goals with firms that are leaders in their industries.

3. Sage has a clear market and product strategy which involves Sage’s business partners, advisors, and its customers. This involves ongoing discussions to explore with customers needs, wants, and desires for applications that can help its businesses perform and grow.

4. Sage has continuously created lasting relationships with its customers in many ways, through a full complement of products supported by its markets and product strategy so that its customers can now easily migrate from starter products to more advanced applications. Also, well beyond the initial software sale, Sage helps customers to maximise their software investment and further
increase their effectiveness by offering ongoing training and award-winning service and support.

5. Sage continues to acquire new customers through acquisition and as first-time purchasers of its business management products for SMEs. From these points of entry, new and existing customers continually offer suggestions and insight to help refine its products and services worldwide.

6. Sage attracts, develops and retains employees. Many employees have joined Sage through acquisitions and recruitments. These new employees bring new ideas, fresh perspectives, and solid experience in their respective products and industries. To reap the maximum benefit from these skills, Sage has a decentralised approach through which it can leverage individual employee strengths and specialities across the firm, regardless of employee location. In attracting the best and the brightest employees and retaining them, it offers career advancement for employees to move up and/or across the firm, and ability to leverage employee strengths and specialities.

7. Sage has consistently achieved financial reward. Sage believes in investment in its people, products, and the markets they serve. By maintaining its profit and growth, Sage invests in its customers’ interest successfully through continuous product development and understanding of its customers’ needs. These strategies have been proven to deliver growth in Sage’s established markets over the past decade.

Sage employs almost 13,000 people in 17 countries, of which over 1500 are in the UK. In order to continue to grow as a business, Sage continuously recruits and retains only the best talent. Therefore the firm’s policy is to pursue practices that are sensitive to the needs of their people. The Sage team is its strongest asset and is made up of the most dedicated, enthusiastic and driven people in the world, and Sage is committed to develop and nurture this valuable resource.

Further, Sage has 4.7 million customers and advises 1.3 million customers through support contracts. Almost 500,000 UK businesses already rely on Sage. Its business with existing customers is driven by a broad range of established market-leading products, services that encourage a loyal customer following, a clear product migration path, cross-selling opportunities, and a focus on serving the specific needs of customers.
Sage offers outstanding customer service, and its customer-centric approach is designed to engender customer loyalty, whilst at the same time setting itself apart from its competition. Furthermore, Sage has a global network of 23,000 reseller partners and 40,000 accountants. Its partners fall into three main areas: (1) Sage Business Partners who are trained and accredited to help Sage customers select and install software, and to provide training and after-sales support at a local level. (2) Sage Developers work with Sage to customise its software to meet the specific needs of individual customers and to integrate the software with third party and industry-specific solutions. (3) Sage Accountants work with Sage to provide IT advice and support to Sage clients. Over 8,000 practices are already members of the Sage Accountants Club.

In the established markets, such as the UK, Mainland Europe and North America, much of the growth in the software sector is driven by SMEs extending business process automation. Sage is committed to meeting the SMEs’ changing needs by offering complementary products for sales and customer service, industry-specific production processes, and management reporting. In emerging markets such as Africa and Asia, growth is driven by small businesses computerising their business processes for the first time. Hence, with the benefit of local understanding and insight, Sage provides software and services that are relevant, practical and useful for the demands of today’s SME business environment. The quality of its products and service encourages recommendation by its customers, as well as by over 40,000 accountants in practice.

4.4.2.1 Sage products and services

Sage has many products that are well known by their recognisable brand names (see Table 4-3), and provides industry-specific solutions and local solutions in their markets. Sage recognises that some customers require industry-specific solutions where business needs may be more specialised and has developed products and services to serve those needs. For example, its current vertical offerings cover the following industrial sectors: manufacturing, construction, real estate, distribution, accountancy, and non-profit charities, schools and hospitals. Sage has also provided small businesses with management solutions designed to suit their local business environment; therefore, within the Group, local management deliver product development, marketing and support services to customers within distinct geographic areas. Table 4-3 shows details of the products and services offered by Sage.
<table>
<thead>
<tr>
<th>Products</th>
<th>Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting, finance &amp; ERP</td>
<td>Instant accounts</td>
</tr>
<tr>
<td>Solutions</td>
<td>Sage line 50</td>
</tr>
<tr>
<td>Payroll &amp; HR Solutions</td>
<td>Instant payroll</td>
</tr>
<tr>
<td></td>
<td>Sage payroll</td>
</tr>
<tr>
<td></td>
<td>Pay for ERP solutions</td>
</tr>
<tr>
<td>Business Intelligence (BI)</td>
<td>Sage BI for Sage line 200/500</td>
</tr>
<tr>
<td></td>
<td>Intelligent Apps</td>
</tr>
<tr>
<td>Sage Business Advice</td>
<td>Sage HR advice</td>
</tr>
<tr>
<td></td>
<td>Sage Health /Safety advice</td>
</tr>
<tr>
<td>Forecasting Solutions</td>
<td>Sage Instant forecasting</td>
</tr>
<tr>
<td></td>
<td>Sage financial forecasting</td>
</tr>
<tr>
<td>Job Costing</td>
<td>Sage job costing</td>
</tr>
<tr>
<td>CRM Solutions</td>
<td>ACT!</td>
</tr>
<tr>
<td></td>
<td>Sales Logix</td>
</tr>
<tr>
<td>E-Business Solutions</td>
<td>Sage transaction mail</td>
</tr>
<tr>
<td></td>
<td>Sage e-banking</td>
</tr>
<tr>
<td>Accounting Practice Solutions</td>
<td>Accounting Production</td>
</tr>
<tr>
<td></td>
<td>Taxation Solutions</td>
</tr>
<tr>
<td></td>
<td>Practice Management Solutions</td>
</tr>
<tr>
<td>Constructions Solutions</td>
<td>Sage CIS controller</td>
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<tr>
<td></td>
<td>Sage construct</td>
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<tr>
<td></td>
<td>Sage construct advanced</td>
</tr>
<tr>
<td>Retail Solutions</td>
<td>Sage pay point</td>
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<tr>
<td>Manufacturing Solutions</td>
<td></td>
</tr>
<tr>
<td>Office Support</td>
<td></td>
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<tr>
<td>Support for Sage Software</td>
<td>Sage cover</td>
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<td></td>
<td>Sage cover extra</td>
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<tr>
<td></td>
<td>Sage Annual licence plan</td>
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<tr>
<td></td>
<td>Report design</td>
</tr>
<tr>
<td></td>
<td>Supporting ERP system</td>
</tr>
<tr>
<td>Training for Sage Software</td>
<td>Self-study</td>
</tr>
<tr>
<td></td>
<td>Classroom training</td>
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<tr>
<td></td>
<td>Other Sage training</td>
</tr>
<tr>
<td>Financing</td>
<td>Sage financing</td>
</tr>
<tr>
<td></td>
<td>Easy plan</td>
</tr>
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<td></td>
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</tr>
</tbody>
</table>
4.4.2.2 Management structure of Sage

Sage operates a devolved firm strategy, which is based on nurturing the entrepreneurship, innovation and team spirit of its people, allowing them to leverage the power of local expertise. This therefore allows Sage to develop compelling products tailored to the local market, which differentiates Sage from the competition.

A clearly defined organisational structure exists within which individual responsibilities are identified and can be monitored. The Board has overall responsibility for the Group. Each executive director has been given responsibility for specific aspects of the Group’s affairs. The management of the Group as a whole is delegated to the CEO and the executive directors. The conduct of Sage’s individual businesses is delegated to the local executive management teams. These teams are accountable for the conduct and performance of their businesses within the agreed business strategy. They have full authority to act, subject to the reserved powers and sanctioning limits laid down by the Board and to the Group’s policies and guidelines. The Board currently comprises a non-executive chairman, the CEO, four other executive directors, and five other independent non-executive directors. The Board meets formally six times a year, reviewing trading performance, ensuring adequate funding, setting and monitoring strategy, examining major acquisition opportunities, and reviewing regular reports to shareholders.

4.4.2.3 Financial performance of Sage

Figure 4-3 below shows the financial performance of Sage, focusing on the revenue, revenue sources, profits, and earnings per share. It could be seen that Sage remains highly competitive in its markets and continues to dominate as the market leader in accounting software. The statement made by the CEO confirms this: “I am pleased to report that Sage has continued to make strong progress. We delivered organic revenue growth of 6%, with growth in all regions and in both software licences and services. We continued to attract new businesses into our customer base. During the year, we expanded our market presence with some significant acquisitions, whilst 2005’s acquisitions have been successfully integrated into our business, showing strong growth and improved margins”.

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Sage has performed consistently over the years, and compared to 2005, Sage’s performance in 2006 was strong: turnover increased by 17 per cent to £935.6m; operating profit increased by 14 per cent to £211.1m; pre-tax profit increased by 14 per cent to £221.2m; and earnings per share increased by 20 per cent to 12.54p. Sage has consistently maintained its competitive position as number one supplier of accounting software to small and mid-market firms. It has delivered organic revenue growth of 7 per cent, with growth in all regions and in both software licences and services. It also continues to attract new businesses into its customer base. Sage has two main revenue streams: sale of software (either as part of an initial sale or as an upgrade or enhancement of an existing software system) and the sale of services, principally support contracts, training, and business forms. On a constant currency basis, in 2006, software sales increased by 6 per cent from 2005 whilst services revenue grew by 12 per cent. Services revenue contributed 65 per cent to total revenue in 2006, and software sale contributed 35 per cent. According to the Chairman, Sage plc, “I am pleased to report a strong performance, with revenue increasing 22% and earnings per share increasing 20%. These results demonstrate that our businesses have responded
well to the competitive challenges they face”. The financial and operation performance of Sage indicates that it is very competitive in the operating environment.

The above backgrounds of Rolls Royce and Sage indicate that they are market leaders and operate in highly dynamic markets. Though they operate in such markets, they have performed consistently over the past years. The high competitiveness and performance were achieved due to the ability of these two firms to perform certain functions very well, through capabilities which have been developed over the years. The subsequent sections examine the procedures through which data were collected from Rolls Royce and Sage to develop the theory of the process of creating DCs.

4.5 THEORETICAL SAMPLING AND DATA COLLECTION

The initial decisions for theoretical sampling for participants for data collection were based on the general subject area of the phenomenon, and not based on any preconceived theoretical framework or concepts (Glaser and Strauss, 1967). At the sites selected, there were officers, line managers, middle managers, directors and the CEO, and these were people who could be interviewed, but as to which of them would be relevant to the study was not known until the real field work began. To identify the people relevant to the research, the researcher had to be theoretically sensitive so that she could conceptualise and formulate a theory as it emerged (Glaser and Strauss, 1967). Theoretical sensitivity was developed during the research process through asking questions of the data, such as what, how, who, where, why, what is the position of the emerging theory, how is it conceived in the data, and probing the data to identify what was actually going on in the data and how it answered the problem. Theoretical sampling was beneficial, because it helped to define the properties of categories, identify the context in which they were relevant, specify the conditions under which they arrived, maintained and varied, and to discover their consequences (Denzin and Lincoln, 2000).

To collect data for the study, participants were first presented with a description of the purpose and the nature of the research. The initial contact persons in the two participating firms were the Head of Technology, Rolls Royce, and the Director of Investor Relations, Sage. When the firms were satisfied with the information given,
interview dates were scheduled. The participants in the study were directors, senior and middle managers. A total of 27 interviews were conducted with managers and directors of both Rolls Royce and Sage. Following the GTM, the researcher entered the field with no preconceived perceptions or opinions to colour the investigations. The researcher was open in terms of structure and direction of the interviews to enable concepts to emerge, rather than force them into predefined categories (Glaser and Strauss, 1967; Goulding, 2002).

The first two interviews in the firms were used to explore the general areas of how DCs are created there. These interviews were analysed and several codes and concepts were generated. Based on this, theoretical sampling was conducted to select further participants for the study. So, the researcher interviewed people who would maximise the opportunities to discover variations among the concepts and to collect more data on categories in terms of their property and dimensions (Glaser and Strauss, 1967; Strauss and Corbin, 1998). The researcher used the ‘snowball technique’ to negotiate contacts for subsequent interviews based on the concepts and categories that needed to be saturated. The snowball effect was achieved by establishing contact for the next interviewee through the previous interviewee based on codes and concepts that emerged from the interview and data analysis.

This snowball technique was very beneficial for the collection of data. For example, during the interview with the Business Development Manager, Rolls Royce, the concept of learning came up. The Business Development Manager could not explain in detail how learning is conducted to develop DCs and suggested the researcher should contact the Senior Electrical Engineer for the data required. This is the statement made by the Business Development Manager during the interview in relation to the contact: “Probably the best contact I can think of is Brian Simmers, he worked within the SRC and he heads the electrical engineering team in the SRC and I think he is the best point of contact to see how the learning activities work was carried out”. A copy of the research brief (see Appendix B1 & B2) were sent to the Senior Electrical Engineer by e-mail, and following that, an interview date and time were arranged. Appendix C shows the list of those interviewed for this research.
4.5.1 Interview Setting

The time and place for the interviews were arranged with the participants according to their schedules. About 90 per cent of the interviews took place in conference rooms on the firm premises, and about 10 per cent in offices of the participants or by telephone. The decision to use the conference rooms was made by the participants because it offered them the privacy and fewer interruptions both from employees and the telephone, as opposed to using their offices. This was made evident during one of the interviews in an office when we had seven interruptions during an hour interview. The interviews were audio-taped with participants’ consent using a tape recorder and mini-cassettes. The audiotape was considered very appropriate for the study because it would have been difficult and time-consuming to take notes verbatim during the interview process without losing track of the interview. However, due to the risk of technological failure in using equipment such as the audiotape, notes were taken, but they were limited to main concepts that emerged during the interview as a backup.

4.5.2 Interviews

In all, 27 interviews were conducted and 20 e-mails were received from the managers and directors of both Rolls Royce and Sage. During the interviews, participants were encouraged to talk about the process of creating DCs. To have the right environment for the interviews, most of the interviews commenced with a discussion on the DCs that Sage and Rolls Royce have developed to compete in their dynamic environment. This was then followed by the main question of how DCs are developed in their firms. Due to the flexible nature of the unstructured and semi-structured interviews, participants were encouraged with the right prompts and probes to recollect personal experience and conceptions of the subject of how DCs are created, which assisted the discovery of concepts, categories, and their properties for the study. They were encouraged to elaborate on themes that they felt were an integral part of the process of creating DCs in their firm. During the interviews, the researcher also probed deeper into areas that were seen as vital parts of the process of developing DCs.

To be able to capture the information required and the richness of the interviewee’s responses, the researcher created the appropriate rapport, which was open to the feelings of the respondents and which enabled them to cast their stories in their own
terms. This involved listening to the stories with openness to the feelings and experience, examining how the respondents perceived and described their perceptions on the development of DCs, which involved subjective evaluation of events rather than objective. The researcher developed rapid insights during the interview, formulated questions quickly and smoothly, and tried to avoid questions that might create interpretations of the phenomenon. The researcher also requested access for follow-up, which was granted, based on the good rapport built with participants.

As data collection and analysis were carried out simultaneously through theoretical sampling, constant comparison, and writing of theoretical and operational memos before conducting the next interview, this assisted to identify the next participant and details of areas that had to be explored using a semi-structured interview approach. Interview protocols were developed and used as a guide to carry out the semi-structured interviews. The interview guide topics focused on specific areas and categories that needed to be developed. Hence, the questions were broad and did not include a priori constructs or guiding theories. These questions assisted the researcher to find out what kind of things were happening, rather than the use of predetermined kinds of things that the researcher believed could happen. According to Weiss (1994), an interview guide is a listing of areas to be covered in the interview, and for each area, a listing of questions that together will suggest the line of inquiry. However, in this study, the interview protocols basically listed broad areas of the research to be covered, without any additional questions to guide the interview.

Thompson (1978) maintains that the duration of an interview can vary, and this depends on the personality of the participants. The length of the interviews varied from forty minutes to two hours. Although some of the interviews were short, they provided rich data and further properties and dimensions of already developed concepts and categories. Most of the interviewees were very forthcoming with their responses and information, and the researcher only asked questions for clarification on information given. However, a few of the interviewees had to be prompted in certain areas of their responses to get them to dig deeper for more information.

During the interviews, the researcher explored, probed, and asked questions to elucidate the process of creating DCs (Patton, 2002). It took a lot of effort and time to conduct the interviews to gather data. Again, because the questions were not structured in this
type of interview, the researcher’s effects such as leading questions and biases could not be eliminated completely. It was also difficult to analyse the data from this kind of interview to identify patterns that emerged from different participants (Patton, 2002).

To ensure that these limitations were reduced to a minimum, first of all the role and skills of the researcher were very important. Asking questions and getting responses is not the only thing that happens in such a conversational type of interview. The interpersonal skills and characteristics of the interviewer and participant play a major part. The researcher built rapport with the participants of the study, first of all by sending e-mails and following up with a brief telephone conversation. The researcher was able to interact with senior and middle management participants in the settings where the interviews were conducted.

Further, the difficulty of analysing data from in-depth unstructured and semi-structured interviews was reduced in this study because the NVivo2.0 computer-assisted qualitative data analysis software was employed to assist with the management and analysis of data. The NVivo2.0 assisted with the microanalysis and finding patterns in the data through the use of its code and search facility. It facilitated recognising patterns, quick retrieval, and comparison of already coded data with new slices of data. Finally, the use of theoretical sampling and the constant comparison method also minimised the difficulty of analysing data, because the researcher samples the next participant to interview and the area of focus of the interview based on emerged concepts.

4.5.3 Ethical Considerations

In qualitative research design, it is important to address ethical issues that may arise in the course of the study (Rossman and Rallis, 1998). Collecting data in a natural setting through access to sensitive documentary evidence and face-to-face interviews can be very intrusive in the firm being studied. The researcher respected the rights, needs, values, and desires of the participants. The following steps were taken to protect participants’ rights:
The research objectives were articulated both verbally and in clearly written form to enable the participants understand the purpose of the research and what it entailed, including how the data would be used.

The participants gave both verbal and written consent before the studies were conducted.

The participants were made aware of all the data collection devices and activities.

The verbatim transcriptions, interpretations, and reports would be made available to the participants if they requested for them.

Their rights, interests and wishes were considered when choices were made regarding reporting the data, and they were given the opportunity to take a decision on whether they wanted to be anonymous or otherwise.

4.5.4 Successes and Limitations of Data Collection Process

The data collection process was successful. The participants appeared interested and forthcoming with their responses, and this was attributed to the brief on the research and a document explaining DCs sent to each of the interviewees before the actual interview. Hence, most of them had an idea of what the research was about and were able to contribute. Some of the participants even offered to be available for further inquiries on the research. This opportunity was used on a few occasions for further clarification and for selective sampling on concepts that needed to be saturated.

While the progress of the research was relatively smooth, it was not without some hitches along the way. Gaining access to conduct research in firms was a very difficult process. Considering that the participants for the study were senior and middle management, time was an issue. Hence, the researcher had to negotiate with participants in both Rolls Royce and Sage for dates and times for the interview. The process of interviewing went smoothly, and the only problem was that one recording was lost due to a technical failure. However, because the researcher took notes on the main concepts, and also the participant sent in a written summary on the main points covered during the interview, the issue was resolved. The most difficult area of the research was the lack of resources to travel to Newcastle for collection of data, and as a result, four of the interviews were conducted by telephone. Again, due to the sensitive
nature of DCs, not all information on the process of creating DCs was made available for the study.

4.6 DATA MANAGEMENT

Each interview was transcribed verbatim after the interview and analysed. The reason why the researcher transcribed the data on her own was to avoid losing certain vital information, which might be important for the analysis and development of the theory. A database was established for each interview. The researcher kept a field notebook during the data collection and analysis which was used to record details of the researcher’s feelings, experience and perceptions during the entire data collection and analysis process. The NVivo2.0 computer-assisted qualitative data analysis software (CAQDAS) was employed to manage the data. The section below discusses the rationale for using CAQDAS, the type of CAQDAS employed, and the benefits and limitations.

4.6.1 Computer-Assisted Qualitative Data Analysis Software (CAQDAS)

Computer-assisted qualitative data analysis software (CAQDAS) are software packages that have been developed purposely to assist with the analysis of qualitative data, and a variety of tools are available to support the different approaches of qualitative research (Miles and Huberman, 1994; Denzin and Lincoln, 2000; Patton, 2004; Silverman, 2005). Traditionally, qualitative research analysis has been conducted manually, which involves typing field notes and interviews, photocopying, coding by using markers and pencils, writing them on cards, sorting and shuffling the data (Denzin and Lincoln, 2000). These are very cumbersome, slow procedures and time-consuming. However, with the advent of CAQDAS, this manual handling of data has now been replaced by computer tools, which assist researchers to perform these processes more easily and faster.

There are debates amongst qualitative researchers regarding the use of CAQDAS programs for conducting qualitative research (Goulding, 2002). The debates arise because computer programs are associated with statistical types of research, which can be programmed into these computers since they are well described at the outset of the
study. On the other hand, qualitative analysis is less formulaic, which requires an interactive cycle of thinking and innovation (Denzin and Lincoln, 2005; Silverman, 2005). Also, qualitative research as a social movement emerged as an initial radical response to quantitative research. According to Silverman (2005: 189), "This involved a heartfelt rejection of the technological appearance of statistical work, which smacked of dehumanization, over-control, obsession with technical puzzles rather than engagement with pressing social and political issues of the time". To the qualitative researchers, computers represented all these things and therefore they do not associate with this technology for fear it might impose an alien logic on their analytic procedures. These reservations about computers and qualitative research impede a more balanced assessment of the merits and demerits of using CAQDAS in qualitative research. It must be emphasised that although CAQDAS does not provide the facilities for all the things qualitative researchers want to do with their data, it offers significant benefits for data analysis (Silverman, 2005). The next section explains the reasons for using CAQDAS and the type of software selected to assist with data analysis in this study.

The rationale for using CAQDAS is to assist with the proper management of data, their storage and retrieval, and speed of handling, to help with sampling decisions for theory development, and improve rigour during the research and analysis of data (Denzin and Lincoln, 2000; Fernandez, 2004; Silverman, 2005). There are various types of CAQDAS and the different types perform different functions. Fielding (2000) distinguished between three types of qualitative analysis software: text retrievers, code-and-retrieve packages and theory builders. Fielding (2000) advised that the packages vary substantially, therefore researchers must use care in selecting the right software for the particular set of analysis they would carry out. The text retrievers specialise in finding all the instances of words and phrases in text, in one or several files. Examples of such tools are Sonar Professional, the Text Collector, and ZyINDEX. Code-and-retrieve programs are built purposely for qualitative analysis, and these tools specialise in allowing qualitative analysts to apply category tags to passages of text, and enable the analyst to later retrieve and display the text according to the coding. It also has a facility to search for words, codes or phrases. Examples of the code-and-retrieve programs are HyperQual2, Kwalitan, QUALPRO, Martin, and the Data Collector.
The theory building programs are built on the code-and-retrieve; however, they have more features than the latter. They have facilities which aid the theory generation process such as building higher-order classifications and categories or formulating theoretical propositions about theory. The theory building programs have the following features: (1) powerful features for writing memos, (2) flexibility for storing and retrieving information, (3) extended and sophisticated hyper-linking features that allow the analyst to link text together or to create links among segments, and (4) modelling features that allow the analyst to depict their emerging theories visually. Examples of theory building software are After, AnSwer, AQUAD, ATLAS/it, Code-A-Text, HyperResearch, NUDIST, N6, NVivo, QCA, Ethnograph, and WinMax (Denzin and Lincoln, 2000).

With the knowledge of the different types of CAQDAS, the researcher has to select the appropriate software for data analysis. It is very important to select the software appropriate to the aims and objectives of the research. Since the aim of this research is to build a theory, the selection of a theory building software is most appropriate. Though CAQDAS is designated as software for all types of qualitative analysis, most of them have an in-built bias towards one or the other qualitative methodologies; hence, it is important to select software that reflects the methodology of this study. For example N6, NVivo and ATLAS/ti have been developed with a bias towards the GTM. Although the connection between CAQDAS and the various strands of GTM is certainly not a deterministic one, an analysis of citations which refer to CAQDAS clearly shows that grounded theory is the dominant approach among CAQDAS users (MacMillan and Koenig, 2004). Even the lesser known CAQDAS may also be biased towards a methodology. For example, Kwalitan is well suited for a Weberian ideal type of analysis (MacMillan and Koenig, 2004). To select the appropriate software for analysis, the theory building software N6, ATLAS/ti and NVivo2.0 were analysed. It was identified that N6 and Atlas/ti are suitable for large projects and the NVivo2.0 software program works well with smaller to medium size projects. Therefore the NVivo2.0 was selected as the most appropriate package for this study because it is a theory-developing software, which is consistent with the GTM methodology and the small size of the research project.
NVivo2.0 is designed to aid researchers who need to combine subtle coding with qualitative linking, shaping and modelling. It is also a fine-detailed analyser which integrates the processes of interpretation and focused questioning. Records are saved as rich text and are freely edited, coded and linked with multimedia. NVivo2.0 enables the analyst to take qualitative inquiry beyond coding and retrieval processes, supporting fluid interpretation and theory emergence. This is made possible because of the special features of NVivo2.0. The special features enable data linkage with ideas (memo), and assists with the immediate access to interpretations and insights through the flexibility of storing ideas with data and the ease of storing and retrieving data. Further, the wide range of new tools in NVivo2.0 allows the researcher to shape, filter, and assay arrays of data, and conduct qualitative modelling that gives visual display of emerging theories and hunches. Finally, it has an integrated search facility for questioning data.

Fully transcribed data from all the interviews and documents were imported into NVivo2.0. This was used to conduct microanalysis to create free nodes (thoughts and definitions about data, along with selected passages of text), concepts and ideas, develop tree nodes, and model relationship of concepts and categories about the data to develop the theory.

4.6.1.1 Experience and benefits of CAQDAS

Although there are varied concerns raised on CAQDAS, using NVivo2.0 reveals that it has a number of implications for the quality of this study. The NVivo2.0 made it easier to organise the entire research work with records to code the data and the flexibility to view and review data to see ideas develop as often as possible. It was very easy to keep track of, retrieve and manage data (Tesch, 1990). Again, due to the flexibility of NVivo2.0 software, it was possible to experiment with ideas and coding without really committing to them until the ideas had explanatory power for the phenomenon under study, which would not have been possible with a manual handling of data. The sophisticated nature of the software increased access to the data, reduced paperwork that would have been encountered with manual handling, and helped to keep track of data from multiple sources. The use of NVivo2.0 assisted with the speedy handling of large volumes of data, freeing the researcher to explore analytic questions of data (Silverman, 2005). CAQDAS gave the researcher ease of retrieval and data searching which saved time and was more efficient than manual procedures. It was also easier to
keep track of and identify data and items of interest to the phenomenon under study (Fielding and Lee, 1998). The modelling facility in the software was also used to depict the emerging theory visually, which helped to review the relationships between the concepts and categories, and the selection of the core category and the basis for the final model. Using the software allowed the creation of a trail of analysis which has been maintained for easy replication and transparency (Conrad and Reinharz, 1984). The trail of analysis also assisted with theoretical sampling decisions for developing the theory.

4.6.1.2 Limitations of CAQDAS

Despite the benefits of CAQDAS, there are a few limitations to consider. First of all, the researcher had to make time to learn how to use the software before using the tools. In spite of this, comparatively it was not as time-consuming and messy as the manual handling of data. Second, unlike other editor programs such as Microsoft Office which automatically creates backup for projects, CAQDAS does not, and backups were created manually; forgetting to create and update backups would lead to loss of data in case of any eventuality such as the corruption of the project file. Third, the experience with CAQDAS demonstrates that most CAQDAS do not support all the different types of file; they only import rich text and plain format text. For example, NVivo2.0 only imports rich text format files and does not conduct automatic editing and movement of text. Fourth, in using computer software packages for coding text documents, only a small section of the data is visible at any instant, making data scanning very difficult.

There are theoretical concerns about using CAQDAS. Many qualitative researchers consider the use of software a 'threat' to the techniques and skills of a long-established research tradition (Fielding, 1993). These qualitative researchers perceive the danger of superficial analysis of qualitative research through following a set of mechanical procedures. Many have also argued that the available software contains an implicit theory of qualitative analysis, namely grounded theory, which cannot be applied to all qualitative types of research (Fielding, 1993).

In spite of the theoretical concerns, the NVivo2.0 software was clearly useful for sorting, importing and arranging texts, but it did not bring the researcher to the level of analysis required for theoretical analysis. Coffey and Atkinson (1996) argue that that there is no CAQDAS capable of doing analysis on its own and there is no conceptual
advance over manual data sorting. According to Patton (2002: 442), "The analysis of qualitative data involves creativity, intellectual discipline, analytical rigor, and a great deal of hard work. Computer programs can facilitate the work of analysis, but they can't provide the creativity and intelligence that make each qualitative analysis unique". The process of using CAQDAS involves coding, which is not the same as analysis. The software is capable of conducting only a general analysis of the data, so the conceptual analysis of the data to develop the theory was conducted manually.

Therefore, irrespective of the CAQDAS used, coding and analysis require intensive inputs by the researcher (Hunter et al., 2005), so the 'threat' of software to the techniques and skills of a long-established qualitative research tradition is far-fetched (Fielding, 1993). According to Fielding (1993), "Those who have used CAQDAS generally find the 'threat' of the software implausible". This is because CAQDAS does not analyse data, but rather, it provides researchers with tools to assist with data analysis (Denzin and Lincoln, 2000; Patton, 2004). Again, the researcher does not follow mechanistic analytic procedures during the analysis, because the thinking and analysis of the data are conducted by the researcher and not the software. The claim by some qualitative researchers that this software favours certain types of qualitative research than others is minimised. As shown in section 4.6.1 of this chapter, different types of software have been developed that serve the interest of different qualitative research analysis. In spite of the few shortcomings, CAQDAS was very beneficial to the quality and analysis of the data in this research, and the benefits and experience gained outweighed the limitations of the software used.

4.7 SUMMARY

This chapter explained the sources and tools for data collection. It examined the different types of interviews and the rationale for the selection of the unstructured/semi-structured interview as the appropriate tool for collecting data supported by secondary tools and e-mail. Further, the chapter described the interview process, focusing on the role of the interviewer and interviewee, interpersonal communication, site selection, theoretical sampling, interview setting, interview duration, ethical issues, and successes and limitations encountered during the data collection process. It has also explained
how data were managed through audio recording, note-taking of major concepts, and
the use of CAQDAS to assist with the management and analysis of data.
CHAPTER 5 DATA ANALYSIS

5.1 INTRODUCTION

This chapter explains the various analytical procedures used for data abstraction and interpretation. The first part of the chapter discusses the three types of coding in GTM. First, open coding, which is the very basic stage of coding. It involves the identification of concepts, their properties and dimensions. This is followed by axial coding, which involves the identification of relationships among the concepts and categories from the data that have explanatory power for the process of creating DCs in the two firms. Finally, selective coding, which explains how the core categories (higher-order categories) that represent the theory were developed. The second part of the chapter then presents an illustration of how the data were analysed using data from one of the interviews. The chapter concludes by addressing issues of validity and reliability.

5.2 DISCOVERING THEORY THROUGH DATA ANALYSIS

Data collection and analysis were conducted simultaneously (Merriam, 1988; Marshall and Rossman, 1989; Miles and Huberman, 1994; Strauss and Corbin, 1998), and the constant comparative method was used to analyse the data. Data from the two firms, Sage and Rolls Royce, were then analysed to develop the theory of creating DCs at the strategic level. The rationale for comparing data from the two firms was to check whether the initial evidence from the data was correct and to enrich the theory through the identification of more concepts, properties and dimensions. According to Glaser and Strauss, (1967: 23), "On the factual level, evidence collected from other comparative groups - whether nations, firms, counties, or hospital wards - is used to check out whether the initial evidence was correct. Is the fact a fact? Thus facts are replicated with comparative evidence, either internally (within a study), externally (outside a study), or both". The constant comparative analysis of data brings variations into the theory of creating DCs. The similarities and differences of creating DCs between the two firms are thus combined into a model. Figure 5-1 shows a summary of the data analysis process, and the following sections explore this process in depth.
Figure 5-1  Analysis Process

Substantive area (Process of creating DC)
Preliminary literature review of theory
Selection of GTM

Entering field
Theoretical sampling

Field research 1: Open sampling
Data
Additional slice of data
Additional slice of data
Additional slice of data

Field research 2: Relational sampling (additional slices of data)
Theoretical saturation
No

Field research 3: Discriminate sampling (additional slices of data)
Theoretical saturation
Yes

Constant Comparison method (Data Analysis)

Open coding
Concept – properties/dimensions
Concept – properties/dimensions
Concept – properties/dimensions
Concept – properties/dimensions

Axial coding: Relations (prelim. theory)
Concept
Concept
Concept
Concept

Selective coding: Concept checking, refine, prioritise
Core category
Sub-category
Sub-category
Sub-category
Sub-category

Abstract categories/contextualise in literature

Present core categories and model developed
Review and evaluate

Literature review
Memos

Source: Adapted from Goulding, 2002.
5.3 DATA ANALYSIS

According to Miles and Huberman (1994: 10), "Data analysis involves classifying events and the properties that characterise them and data reduction refers to the process of selecting focusing, simplifying, abstracting and transforming the data that appear in written-up field notes or transcriptions". Hence, data collected from the interviews were transcribed verbatim from the tapes and each interview transcript was reviewed for an in-depth understanding. The NVivo2.0 CAQDAS program was employed to assist with the general description and analysis of data. Figure 5-2 shows the process of coding using NVivo2.0.

Figure 5-2  Nvivo2.0 Process of Coding and Analysis to Develop Theory

![Nvivo2.0 Process of Coding and Analysis to Develop Theory](image)

The first stage was the creation of free nodes. This was done by line-by-line identification and coding of possible concepts and the passage of statements to explain the concepts. The next stage was the integration of the concepts and their properties and dimensions into groups based on their relationship to each other in tree nodes. The theory was then developed into a model using the NVivo2.0 model explorer and the tree nodes created. The model explorer automatically created a model based on the information selected from the tree nodes to illustrate the theory diagrammatically.

The data were analysed using the constant comparative method (Glaser and Strauss, 1967) of joint coding and analysis of the data, which assisted with the systematic generation of the theory (Glaser and Strauss, 1967). The constant comparative method comprised four stages: comparing incidents applicable to each category, integrating categories and their properties, delimiting the theory, and writing the theory. Table 5-1 below shows the stages and the various actions taken.
Table 5-1  Stages of Constant Comparison Method of this Research

<table>
<thead>
<tr>
<th>Stage</th>
<th>Action Taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comparing incidents applicable to each category</td>
<td>Open Coding - Identified concepts, properties, dimensions and categories</td>
</tr>
<tr>
<td></td>
<td>Theoretical Sampling - Open Sampling</td>
</tr>
<tr>
<td></td>
<td>Memos</td>
</tr>
<tr>
<td>Integrating categories and their properties</td>
<td>Axial Coding - Paradigm Model</td>
</tr>
<tr>
<td></td>
<td>Relational Statements</td>
</tr>
<tr>
<td></td>
<td>Relational and Variation Sampling</td>
</tr>
<tr>
<td></td>
<td>Memos and Diagrams</td>
</tr>
<tr>
<td>Delimiting theory</td>
<td>Selective Coding - Integrating Categories</td>
</tr>
<tr>
<td></td>
<td>Discriminate Sampling</td>
</tr>
<tr>
<td></td>
<td>Memos and Diagrams</td>
</tr>
<tr>
<td></td>
<td>Reduction of terminologies and concepts</td>
</tr>
<tr>
<td>Writing theory</td>
<td>Memos and the substantive theory</td>
</tr>
</tbody>
</table>

5.3.1 Coding Process

Analysing qualitative data involves the use of coding strategies, and according to Strauss and Corbin (1998: 101), "The first level of the analysis is open coding. Opening coding is the analytic process through which concepts are identified and their properties and dimensions are discovered in the data". Following this, the first stage of the data analysis was open coding. During open coding, data were read line by line to identify the possible codes, their properties\(^{10}\) and dimensions\(^{11}\), using NVivo2.0 CAQDAS and the constant comparison method. Figure 5-3 below shows a screen shot of examples of some of the free nodes: concepts, their properties, and dimensions created in NVivo2.0 during open coding.

Memos were written in relation to the generated nodes, and this led to the first theoretical sampling to identify more codes, concepts and recurring patterns in the data set. The theoretical sampling at this stage of the analysis was open to anyone in the company who could give information on how DCs are created.

\(^{10}\) Properties denote the characteristics of a category; the delineation of the properties defines and gives the category its meaning (Strauss and Corbin, 1998).

\(^{11}\) The dimensions of a category in contrast, identify the range along which the general properties of a category vary and therefore give specification to that category and variation to a theory (Strauss and Corbin, 1998).
The line by line coding was followed through until a recurring pattern of codes was identified across the data collected. During open coding, many concepts were abstracted from the data and when a recurring pattern was identified across the data sets, open coding was abandoned for a more focused axial coding. The concepts developed from the open coding guided the type of literature which was reviewed. For example, some of the concepts abstracted from the data were recruitment, acquisitions, planned and emergent strategies, and innovation, and literature in these areas was reviewed.

With axial coding, the concepts developed from the open coding were then grouped together, based on their relationship with each other. So each concept was analysed in terms of its properties and its relationship to each other. The categorisation and relationships of the concepts were identified through the constant comparison of data and the very nature of in vivo patterns of relationships in the data which were grouped
For example, as shown in Figure 5-4, the activities for developing DCs were grouped into zero-level capabilities, improve and remain competitive, certain key resources, strategies and activities. Under each of these categories, there were sub-categories related to the main category. For example, two types of development activities (internal and external) for developing and renewing DCs were identified. The properties and dimensions, such as the types, amount, duration, and costs of how these developments are conducted, were all coded as sub-categories. This shows a relationship between the sub-categories, and the two development activities and the main category activities. At this stage, memos were written in the form of relational statements, which also helped
with further integration of the codes. Using recruitment as an example, the following code note/theoretical and operational memos in sections 5.3.1.1 and 5.3.1.2 were written.

5.3.1.1 Code note/theoretical memo relating to axial coding (developing concept)

Through analysis of the passage in section 5.4, recruitment is an action and interaction part of the process of creating DCs. It consists of bringing people into the firm, both graduates and experts. It shows a relationship between internal firm development and people capability. The passage also illustrates that recruitment is a process. First, the condition noted in this passage of the interview is related to recruitment, rather than developing DCs and this relates to the need to bring people into the firm for 'certain types of skills'. The activities here involve bringing people in through certain 'types of entry' which are 'direct and 'traditional' graduate entry and 'direct' expert entry from competitors and universities. Finally, getting the people accustomed to the operations of the firm is carried out through 'training', graduate training schemes and faster training schemes. The graduate training scheme takes about three months to learn the basic current technology in the operations of Rolls Royce, for example. The consequence of recruitment shows in the passage. The relationship between recruitment and the development of DCs is indicated with the statement made by the Head of Business Management, Rolls Royce, in the passage; "There are many ways through which we do this. We recruit very bright end graduates. We occasionally bring in people who are recognised industry experts". This means that recruitment is one of the activities through which DCs are developed. Hence, looking at the process of identifying the need, bringing them in, and getting them accustomed to the operations is a learning experience both for the firm and the people, and through that the firm develops the ability to carry out successful recruitment.

5.3.1.2 Operational memo relating to axial coding

From the theoretical memo above, there was the need to conduct an interview purposely on recruitment to find out if there are other properties and dimensions related to this concept. For instance, is recruitment only carried out for specific skills or could there be other reasons? At this stage of the research, there was no theoretical saturation because there are areas of the concept that were not explained, hence the researcher carried out
interviews specifically on the concepts and categories that had emerged to find out other properties related to them.

Using Strauss and Corbin's (1998) paradigm model of axial coding, these concepts were then grouped into descriptive categories through the use of tree nodes in NVivo2.0. The paradigm model consisted of four stages: (1) identifying the phenomenon which represented the context of the research, the process of creating DCs, (2) conditions which assisted in answering the questions of why, how, and what happens for the two firms to develop DCs, (3) the action and interaction part which outlined the approaches and strategies through which DCs were developed in the two firms, and (4) the consequences, through which the outcomes of developing DCs were identified. It must be emphasised that the paradigm model of axial coding was used as an analytical tool which assisted with the integration of the structure (the conditional context within which the phenomenon of creating DCs is situated) with process (the sequence of actions and interactions pertaining to a phenomenon as they evolve over time, and in this case how the process of creating DCs evolved). The statement made by Strauss and Corbin (1998: 128) supports this. They maintain that, "In actuality, the paradigm is nothing more than a perspective taken toward data, another analytic stance that helps to systematically gather and order data in such a way that the structure and process are integrated". The paradigm model was therefore used as a guide to gain an understanding of the phenomenon and not just as a dogmatic approach to data analysis (Strauss and Corbin, 1998).

During axial coding, relational theoretical sampling was conducted to collect more data. The theoretical sampling was focused on finding more properties and relationships to integrate the emerged concepts. At this stage, diagrams were drawn to depict the emerging preliminary model of the process of creating DCs. During the coding, a number of concepts were rejected (e.g. strategic decision-making, internal networking) due to their non-recurrence in the data and lack of explanatory power for the emerging theory. Categories and concepts developed were then checked with extant literature on DCs to enhance the theoretical focus of the emerging theory.

According to Strauss and Corbin (1998: 179), "Theory without a process is missing a vital part of a story—how the action/interaction evolves". Process plays an important role in bringing about either specialisation or co-ordination (Bowman and Faulkner,
For this study, it was important to bring process into the development of the framework of how DCs are created because it is the central category of the study. A strategy-making process (SMP) is an organisational level phenomenon involving key decisions made on behalf of the entire organisation. The SMP involves activities such as analysis, planning, decision-making and many aspects of organisational culture, vision and value system (Hart, 1992; Dess and Lumpkin, 2001). The aim of a SMP is to enact the organisation's purposes to sustain its vision and generate wealth. Therefore, the SMP refers to the methods and practices organisations use to interpret opportunities and threats and make decisions for the effective use of resources. In strategy process research, Van de Ven (1992) made three interrelated suggestions for studying SMP: defining the meaning of process, clarifying the theory of process, and designing to observe the strategy process.

The development of DCs involves a process and it is important to explain what 'process' means in the creation of DCs. It is also important to note that although the term 'process' has often been associated with bureaucratic procedures and control, in this study it is used to explain the evolution of DCs. Defining process in strategy process research is very crucial as it forms the basis of the entire research and indicates one's meaning of process in relation to other use in the literature. In this research, process is defined as a sequence of events or activities that describe how a phenomenon changes over time or represents an underlying pattern of cognitive transition by an entity in dealing with an issue (Van de Ven, 1992). This definition of process takes a historical developmental perspective, and focuses on the sequences of incidents, and activities that unfold over the duration of a central subject's existence. This meaning of process fits with this research agenda and helped to examine the sequence of activities and events of how firms develop DCs at the strategic level. The theory of process consists of statements that explain how and why a process unfolds over time. In studying strategy process, such a theory is very important because (1) it offers a grounding of the conceptual basis of a process study of formulation and implementation, and (2) it guides the design and conduct of the empirical research. The process is a series of evolving actions that occur over time in response to a situation, the action may be strategic, which is taken in response to problematic situations, or may be a routine or conducted without much thought. The process may be rly, interrupted, sequential, or coordinated, or a total mess. What makes the action a
process is its evolving nature and varying forms which are related to the same purpose (Strauss and Corbin, 1998).

In this study, coding for a process was not based on stages of creating DCs; rather, the intent was to code for a process of aligning the actions and activities of developing DCs to the reasons why they are developed, and to identify the variations within an action. Process therefore represented the dynamic evolving nature of action/interactions. From the analysis, it was identified that the process and structure of the two firms were inextricably linked and, as stated by Strauss and Corbin (1998), structure creates the context for action/interaction and that is what gives it the rhythm, pacing, form and character. Coding for process focused on the action and activities undertaken by the firms to develop DCs. The actions and activities were traced over time, noting how and why they change. During data collection and analysis, it was identified that some of the changes in the external and internal context of the two participating firms were anticipated, planned for and predicted, whilst others occurred unexpectedly and had to be resolved, which called for further actions to be taken (Strauss and Corbin, 1998).

Coding for process was conducted simultaneously with axial coding, that is coding for properties and dimensions and relationships among concepts. The following questions were used to guide the analysis for process: What is going on here? What issues arise? What happenings are being handled through the action/interaction? What form do they take? What conditions combine to create a context in which the action/interaction is located? Why is the action/interaction staying the same? Why and how is it changing? Are actions/interactions aligned or misaligned? What conditions and activities connect one sequence of events to another? What happens to the form, the flow, continuity, and rhythm of action/interaction when conditions change, that is, do they become misaligned, interrupted or disrupted because of contingencies (unplanned or unexpected changes in conditions)? How do the consequences of one set of actions/interactions play into the next sequence of actions/interactions to either alter the actions/interactions or allow them to stay the same? (Strauss and Corbin, 1998). The process identified was then broken down into individual tactics, strategies, and activities that assist in creating DCs at the strategic level. The findings were combined to classify the components of the process of creating DCs between the two firms, as well as explaining any differences in the DC creation process specific to each group.
According to Strauss and Corbin, (1998: 168), "Studying the routinisation of action and interaction especially in firms, and discovering what conditions make it possible to stay routine in the face of contingencies (unanticipated happenings) can be just as important a contribution to knowledge development as is studying the novel and problematic action/interaction". The reason why the data were analysed for process was to assist in giving the theory a sense of 'life' or movement. Further, it aided the discovery of variation, as it assisted in the identification of patterns of how action/interaction changes over time and in response to contingencies. Furthermore, by relating structure to the process, it assisted with the connection of categories to develop a theory which contributes to knowledge on the process of creating DCs.

During data analysis, events, acts and outcomes were conceptualised and classified. The categories that emerged, along with their relationships, were the foundations for developing the substantive theory. This abstracting, reducing, and relating are what differentiates theoretical coding from descriptive coding (Strauss and Corbin, 1998). The researcher also made imaginative use of theoretical comparisons, constantly asking the following questions of the data: why, who, how, where, how long and what is the outcome, and this aided the discovery of properties and their dimensions. However, it must be emphasised that because most of the properties and dimensions were evident in the data, the researcher did not have to rely much on theoretical comparison.

The final coding in the data analysis was selective coding. Through selective coding, the developed categories were integrated into higher-order conceptual categories. Selective coding involves the selection and refining of categories through reducing terminologies, selecting the core category, and identifying gaps that have to be filled (see Figure 5-1). Theoretical sampling in the form of discriminate theoretical sampling was conducted to fill the gaps identified. This sampling was conducted selectively with people who provided information required on specific categories that had to be theoretically saturated. The data collected were then compared to the previous data until no new information was coming through that explained the emerging theory, thus reaching theoretical saturation. To ensure that the data had reached theoretical saturation, theoretical sampling was conducted to further develop categories in terms of their properties and dimensions, and previously collected data and memos were reviewed. The core category selected for this research was 'developing and renewing
DCs'. During the process of coding, many memos and diagrams/models were produced to depict the emerging substantive theory. The final part of the analysis focused on critical review of the entire data, which involved the abstraction of data. This moved the analysis from a descriptive to a theoretical interpretation through integrating data with extant literature.

5.4 ILLUSTRATION OF ANALYSIS PROCESS

This section presents examples of the process of how data were analysed and abstracted, using one of the interviews at Rolls Royce. Below is an illustration of how the open coding was carried out. This is based on a section of the interview with the Head of Business Management (HBM), Rolls Royce. The codes identified from the data are highlighted and put in brackets. Two types of brackets were used: square and curly. Square brackets are used to demonstrate in vivo codes which were the actual words of the interviewee used as concepts and categories, and curly brackets are used for labels placed on codes by the researcher based on explanation given by the interviewee.

**Researcher: What is the process through which Rolls Royce develops DCs?**

**HBM: I think we have many routes to doing that** [Many routines for developing and renewing capabilities]. **We recruit [recruitment] very bright top end of graduates [very best graduates], we like to think we get the [crème], I don’t know, I think other people also do. We do go to some of the [very best graduates] and we bring them to the firm. That is always a [continual flow]. We try and [maintain that dream down to the end]. There are two routes, there is the [traditional graduate recruitments], [graduate training scheme], which is approved by the [professional institutions], the [IMEC, IE] and other institutions, for example, Institute of Materials. So that gives us [quality standards] in which we bring them in and they are then taken into [specific departments] where they go round during that training scheme [rotation] and they spend [three months] learning [basic current technology]. We have some [direct entry graduates] where we have a particular need for [certain skills], so we bring them into a [faster track training scheme]. I would not go into detail, that is, because I know you can find that out from the training people, that is, one route. I dare say like other companies, we [occasionally] bring in people who are [recognised industrial experts],
[occasionally] some of them from [competitors] which is [not very often], I am surprised in a way how few of those we get, [few experts], but we do have them from [time to time].

We have what I think is a clever system. That is, we have [skill owners] and so if we consider some of the [core skills and capabilities] in Rolls Royce [aerodynamics, aero thermal, stress], some of the [specific components] might be [turbine blades specialists] or [fan design specialists] or [combustion], then they are grown internally {some specialists grown internally} quiet often over a long period of time {long-term}. It might be about [ten years] before they can reach a [high level of competence] in those post-graduation, but the skill owner acts as a sort of [professional anchor] around the whole organisation by looking and saying, for example, do we have enough aero-dynamicists to keep looking into the future, are they the [right type of skills], are they the [right age profile], because if you bring influx in at the same age profile then the bulk will keep moving to the right until suddenly they all retire, and suddenly we have no aero-dynamicists, so clearly they are looking to [replenish with new graduates]. The skill owner also will generally look out across the technology for [world-class experts] and say well, for example in stress, I do not know how long ago, but maybe 15-20 years ago, they discovered that actually there is a new technology called finance..........emerging {identification of a technology capability need}, to speed up to do this, either we [go into universities] {external development} to get some inputs into how it is best done or we [develop it ourselves] {internal development}. To take one example, we [developed a programme called SCO3] which is a stress analysis package and this is now one of the good industrial practices which is highly appropriate, and very efficient and effective stress analysis in aero engines, but I don’t know how good it is because I don’t know about it technically. We recently, probably ten years ago or it might be longer than that, I think most things I know is in the context of 10 or 15 years, set up university technology centres, that is [UTCs] they are known as, and they are in universities where we [provide funding to the universities] and maintain a level of [throughput of PhD students, and research] going on in those universities. We develop specialists in say combustion in one university, or it might be materials for the other university, or electrical control systems for another university, and we take the best universities we can with each specialism {best university for each specialism}. I think there is some route where some of the students working on Rolls
Royce problems during their PhD (student research on RR problems) will pursue the research in the company (entry into RR based on research) and continue to develop the [new technology and techniques] from the [academic side] into the [real world practical side]. That is obviously a very close and very beneficial working relationship [close and beneficial relationship], that means the university gains through having a [tied customer] and we have an [excellent university], which knows it is working at the front end of our technology. The other routes by which arguably we have increased our capability are by using some of our partner companies {partnership} or acquired companies {acquisition}. So, for example, in 1995 or 1996, we acquired the Allison Engine Corporation in Indianapolis in the US, and we were able to share and transfer some of the necessary skills and best practices from those two companies {transfer and sharing of best practices and skills}. So Rolls Royce gained from the Americans techniques developed and their own development centre and they have learned from the Rolls Royce way of doing things. So they probably have new improved materials and different techniques, and that is to be exchanged between companies that have become integrated over time, which is now known as the Rolls Royce Corporation {acquisition integration}.

And we work with [partner firms], firms in the [supply chain], so this not just [engineering], but this is through [techniques] and [manufacturing] and materials, and so on. Through partner companies as well as within the supply chain we [use their skills] and we will also, if we need something new to be developed, we might say 'Here is a function we want you to provide, so you must do this', and then we use the [use the supply company's expertise]. They have the expertise in designing these parts, so rather than telling them how we want it to be done and what we want it made of, we will specify what we want them to do and therefore they will have a bit more freedom to develop the new materials {freedom to innovate} or whatever they have to develop, provided they meet the airworthiness requirements we are allowed to. We would not go and tell them to design part of an aero engine out of a piece of light plastic because when it is working at 1500 degrees, it will melt straight away.

Then we also have a [lot of strength in developing people]. I do not know how many employees we have in that range. It is not just HR, we do not just have such [traditional old fashioned personnel function] that just deals with hiring and firing, and not just a
[training manager] who just says “Oh, go on a course and here is another course in 6 months’ time”. [Employee development] is [proactive and planned] and how we can develop not just leadership for our future population, but how we can take the vast majority of people and keep developing them and making them better and better {developing people to be better} and better overtime. So that is one of the [very high strengths of the firm] {developing all employees}. We strive to be excellent in all that we do {strive for excellence}, whether it is [finance processes] or [quality processes]. We try and [improve the process] all the time, continuous improvement through any of the latest techniques, that is the sense of renewal every year {continuous yearly improvement}.

Researcher: So these are the activities through which you renew your DCs?

HBM: I will say most of the routes, yes, we would look for new [specialist and new people] through [different universities]. I think we [keep a very open mind] and every so often if we need to recruit a specialist, if we recognise some specialism that we do not have in place, then we would go to the [recruitment market] like everybody else does, we do go to the [professional journals] or [university journals] and see if we can find that particular specialist, but that is after identifying the need first {Identify need}.

Researcher: Who identifies this need?

HBM: The [skill owners] will have a general overview of whether we have enough aero-dynamicists. For example, let’s say we have 200 aero-dynamicists in the business and we realise in future to design better engines we need to have 300. In that case, we will [design a new graduate recruitment programme] particularly aligned towards recruiting people who could be good aero-dynamicists. If, let’s say, we need more stress engineers we [target that group] and, in time, you can see how [skills change]. For example, in the past we needed people who could design with paper and pencil on a drawing board, now clearly we do not need those any more, apart from one or two in the company to deal with legacy engines. What we do need now are product life cycle management modellers who will design or develop a whole engine on a computer system, so skills do change, so we watch for our [skills declining in necessity], as well as those growing {growing skills}. If we are talking about particular need, where we spot the need for [particular specialists] they will be found probably by the
engineering directors or chief engineer (identified by engineering directors or chief engineer) in one of the operating units. So, take for example, we have customer-facing business units, we have airlines, marine, defence and energy. The engineering director of say compression or turbine systems might say we need an extra specialist in turbine materials because we do not have enough expertise there, so they will go out and recruit (external recruitment) or they will seek to find them from different parts of the company (internal recruitment), because that is one other thing we do, we [move people around] between the customer units and between some of the operating units and just make sure that we [refresh people]. By moving people around and, say, moving the turbine engineers who work in higher temperatures perhaps to the lower temperature area, the compressor blades and fan blades, perhaps they can bring different knowledge and different types of materials used there. There is another [transferring renewability mechanism], and that as we have acquired companies that are in the non-aerospace market, so we acquired a part of Vickers a few years ago and we brought in a lot of marine technology, people working in the marine technology, and we have been able to do a two-way deal through transferring gas turbine materials into materials for marine applications and coming the other way as well {acquisition of technology}.

Researcher: Apart from working with partners in the supply chain, do you also have other collaboration like joint ventures with other companies as a renewal process?

HBM: Yes, I suppose we do. I am not very familiar with the number of [joint ventures], I know there are about two, one with [fuel cells] with a Singapore company that was just announced recently, recent investment, and the other one that I know of is something like [coatings technology], which develops blade coating. So we have these turbine blades that take most heat out of the engines and actually provide the power of the engine and take power out of the air stream. They can do far better blast longer if they are coated in special materials and ceramics, so I think this joint venture company was set up with one of our [suppliers] or [partners] in [JVs].
Researcher: I think I know about a computer company in the US that you have a JV with.

HBM: Oh, yes, we have Data Systems and Solutions [(DS&S)], which is with Science Application Incorporated Corporation [SAIC]. DS&S has done a lot of work on things like they take data from an engine directly, even though it is still on the aeroplane wing, and those are fed back into a computer system and they can work out when next the engine needs servicing, that sort of thing {experience in data systems solutions}.

Researcher: So these are the areas you mentioned, acquisition, recruitment, UTCs, joint ventures, partnership and people development, that is, the processes through which you renew your DCs. Are they formally planned processes or emergent?

HBM: We sort of [plan ahead and look ahead], that sounds dreadfully sort of organised almost stylist organisation. Five years from now we will have 10,000 more engineers. It is not quite like that, but it [flows and emerges] with the [demand] because over time, let’s take the example, after the September 11th disaster, the demand for new engines design and obviously for delivery events perhaps dropped. Well, actually we did not have a problem with flying hours, our engines went up but the overall demand fell. Our planes percentage-wise were flying more than anybody else’s but we had to reduce the number of people in the business to cope with that demand, but we obviously tried to maintain all the most critical people in the business. So, we were down to civil or core and we kept the very best skilled people we could during that me.

During the interview, certain codes were written down. Then immediately after the interview, a summary of the main ideas and codes were written down as field notes to guide the analysis and the next data collection. This same process was carried out for all of the interviews. Section 5.4.1 is an example of the field notes from this interview.
routes through which this is done. He mentioned the themes stated in Table 5-2 below as the ways through which DCs are developed. He also stated that developing DCs is a continuous approach to strive for excellence and continuous improvement, because if the firm does not change with the market environment, it will become extinct. Further, he stated that being dynamic is very important to the operations of the business.

Table 5-2 Initial Concepts Derived during Interview

<table>
<thead>
<tr>
<th>Initial Codes</th>
<th>Initial Codes</th>
<th>Initial Codes</th>
<th>Initial Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal developments</td>
<td>External development</td>
<td>Employee development</td>
<td>Planned and emergent strategies</td>
</tr>
<tr>
<td>Recruitment</td>
<td>UTPs</td>
<td>Traditional graduate recruitment</td>
<td>Direct recruitment</td>
</tr>
<tr>
<td>Partnerships</td>
<td>Joint ventures</td>
<td>Graduate training</td>
<td>Acquisitions</td>
</tr>
</tbody>
</table>

These initial codes therefore guided the main analysis of the transcript of this interview. The next stage in the process was the process of abstraction of the codes and concepts from the passage of the interview data used.

5.4.2 Process of Abstraction: Open Coding

The recorded data were transcribed and coded (Strauss and Corbin, 1998). During open coding, the interview transcript was read line-by-line and the following codes in Table 5-3 were generated. From this passage of the interview, there were 101 codes of which 77 were in vivo codes. The remainder were labels placed on categories by the researcher from the meaning the categories evoked during comparative examination of the data (Strauss and Corbin, 1998).

At this stage in the analysis process, the coding was largely unfocused and open. Hundreds of codes were identified which had potential meaning and relevance to the process of creating DCs: "Codes are the building blocks of theory" (Strauss and Corbin, 1998: 101), and through coding, the data were broken down into simple analytical pieces, which were then integrated and raised to the conceptual level of a theory. Hence, the data were compared and the codes were reduced and grouped into categories. Since the purpose of open coding is to identify properties and their dimensions, the next stage of the analysis focused on finding the properties and dimensions of the concepts.
<table>
<thead>
<tr>
<th>Codes</th>
<th>Codes</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Many routines for renewing capabilities</td>
<td>Level of throughput of PhD students and research</td>
<td>Student research on Rolls Royce problems</td>
</tr>
<tr>
<td>Recruitment</td>
<td>Direct entry graduates</td>
<td>Replenish with new graduates</td>
</tr>
<tr>
<td>Very best graduates</td>
<td>Acquisitions integration</td>
<td>World-class experts</td>
</tr>
<tr>
<td>Some specialists grown internally</td>
<td>Developed programme called SCO3</td>
<td>Identification of technology capability need</td>
</tr>
<tr>
<td>High level of competence</td>
<td>Basic current technology</td>
<td>Recruitment from universities</td>
</tr>
<tr>
<td>Quality standards</td>
<td>Core skills and capabilities</td>
<td>External development</td>
</tr>
<tr>
<td>Specific departments</td>
<td>Aerodynamics</td>
<td>Internal development</td>
</tr>
<tr>
<td>Certain skills</td>
<td>Aero thermal, stress</td>
<td>Few experts</td>
</tr>
<tr>
<td>Faster track training</td>
<td>Specific components</td>
<td>UTPs set up 10 - 15 years ago</td>
</tr>
<tr>
<td>Rotation</td>
<td>Turbine blades specialist</td>
<td>University technology centres</td>
</tr>
<tr>
<td>Occasionally</td>
<td>Fan design specialists</td>
<td>Acquired companies</td>
</tr>
<tr>
<td>Competitors</td>
<td>Combustion</td>
<td>Time to time</td>
</tr>
<tr>
<td>Graduate training scheme</td>
<td>Continual flow</td>
<td>Right type of skills</td>
</tr>
<tr>
<td>Professional anchor</td>
<td>Long-term - ten years</td>
<td>Right age profile</td>
</tr>
<tr>
<td>Best university for each specialism</td>
<td>Traditional graduate recruitment</td>
<td>Tied customer/excellent university</td>
</tr>
<tr>
<td>Experience data systems solutions</td>
<td>Close beneficial relationship</td>
<td>Entry of students into RR based on research</td>
</tr>
<tr>
<td>Experience data systems solutions</td>
<td>Strive for excellence</td>
<td></td>
</tr>
<tr>
<td>Lot of strength in developing people</td>
<td>Provide funding to universities</td>
<td>Transfer and sharing of best practices and skills</td>
</tr>
<tr>
<td>Recognised industrial experts</td>
<td>Partner firms in supply chain</td>
<td>Focus on engineering, techniques &amp; manufacturing</td>
</tr>
<tr>
<td>Very high in developing all employees</td>
<td>Developing people to be better</td>
<td>New technology/ techniques into real world practical side</td>
</tr>
<tr>
<td>Demand</td>
<td>Human Resource</td>
<td>Strive for excellence</td>
</tr>
<tr>
<td>Freedom to innovate</td>
<td>Proactive and planned</td>
<td>Finance processes</td>
</tr>
<tr>
<td>Develop all employees</td>
<td>Employee development</td>
<td>Quality processes</td>
</tr>
<tr>
<td>Improve process</td>
<td>Skills declining in necessity</td>
<td>Specialists and new people</td>
</tr>
<tr>
<td>Different universities</td>
<td>Keep very open mind</td>
<td>Internal recruitment</td>
</tr>
<tr>
<td>Recruitment market</td>
<td>Target that group</td>
<td>Move people around</td>
</tr>
<tr>
<td>Professional journals</td>
<td>Skills change</td>
<td>Refresh people</td>
</tr>
<tr>
<td>University journals</td>
<td>Continuous improvement yearly</td>
<td>Transferring renewability mechanism</td>
</tr>
<tr>
<td>Identify need</td>
<td>Growing skills</td>
<td>Acquisition of technology</td>
</tr>
<tr>
<td>Capability skill owners</td>
<td>Particular specialists</td>
<td>Fuel cells</td>
</tr>
<tr>
<td>Design a new graduate recruitment programme</td>
<td>Identified by engineering directors or chief engineer</td>
<td>Use of supply company expertise/skills</td>
</tr>
<tr>
<td>Partners</td>
<td>External recruitment</td>
<td>Supplier</td>
</tr>
<tr>
<td>Coatings technology area</td>
<td>Joint ventures</td>
<td>Flows and emerges</td>
</tr>
<tr>
<td>Partnership</td>
<td>DS&amp;S</td>
<td>Plan ahead and look ahead</td>
</tr>
<tr>
<td>Academic side</td>
<td>SAIC</td>
<td></td>
</tr>
</tbody>
</table>
To find the properties, dimensions and their interrelationships, the following questions were used to interrogate the data: why, how, where, who is involved, when, how much or little of the activities are used, and what are the outcomes? Based on these questions, the dimensions of the properties and interrelationships were identified and located on a continuum. Table 5-4 shows an example of how a code (Recruitment) was developed through the identification of its properties and dimensions from the open coding.

Table 5-4 Code Recruitment – Locating Properties and Dimensions

<table>
<thead>
<tr>
<th>Recruitment</th>
<th>Property</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why recruit – skills?</td>
<td>Type of skills</td>
<td>Specific</td>
</tr>
<tr>
<td>Who do you recruit?</td>
<td>Type of graduates</td>
<td>Very best</td>
</tr>
<tr>
<td></td>
<td>Type of experts</td>
<td>Industry recognised</td>
</tr>
<tr>
<td></td>
<td>Amount of experts</td>
<td>Few</td>
</tr>
<tr>
<td></td>
<td>Amount of graduates</td>
<td>A lot (main)</td>
</tr>
<tr>
<td>How do you recruit?</td>
<td>Variation of graduates</td>
<td>Traditional and Direct</td>
</tr>
<tr>
<td></td>
<td>Experts</td>
<td>Direct</td>
</tr>
<tr>
<td></td>
<td>Degree of usage</td>
<td>Occasionally– frequent</td>
</tr>
<tr>
<td></td>
<td>Degree of occurrence</td>
<td>Continual flow- time to time</td>
</tr>
<tr>
<td></td>
<td>Quality of graduates</td>
<td>High quality</td>
</tr>
<tr>
<td></td>
<td>Quality of experts</td>
<td>Industry recognised</td>
</tr>
<tr>
<td>Where do you recruit?</td>
<td>Location</td>
<td>External</td>
</tr>
<tr>
<td></td>
<td>Experts</td>
<td>Competitors</td>
</tr>
<tr>
<td></td>
<td>Graduates</td>
<td>Not identified, find out</td>
</tr>
</tbody>
</table>

The same process was carried out for all the concepts. Most of the dimensions were evident in the interview from the words, sentences and phrases, which indicated an array of influences on the specific concept or category. These codes, their properties and dimensions, were then compared to the new slices of data collected for the presence or absence of these codes, and also the identification of new codes. Table 5-4 shows that open coding and initial axial coding were being carried out at the same time; however, there were other codes that did not fit into the properties of recruitment, hence there was the need to relate them to a category or sub-category which best described them, for example training, partnership and acquisitions.
At this stage, the researcher wrote code note, theoretical, and operational memos reflecting her ideas and thoughts during data analysis. This then paved the way for theoretical sampling for the next person to interview for more properties and dimensions on the codes developed. Subsequent data were compared to these categories, and new properties were identified for the category and sub-category. The section below shows examples of the two memos written about this passage.

5.4.2.1 Example of code note memo on recruitment

**Code note: Created 2/5/05, Properties and dimensions of recruitment**

Recruitment of graduates and recognised industrial experts, two types of recruitment carried out to develop and renew DCs. Property of ‘types’ of recruitment identified and dimensions ranged from experts to non-experts. However, here, emphasis on graduate recruitment as dominant way through which RR recruits to develop/renew DCs. From this, property of ‘degree’ of recruitment of graduates and dimensions of major to partial graduate recruitment identified.

Recruitment of recognised industrial experts described as occasional process, from competitors and other sources. However recruiting from competitors not often the norm, hence property of ‘occurrence’ spotted: dimensions of occurrence ranged from ‘always’ to ‘occasional’ led to property of ‘continuity’ of use of particular type of recruitment. Again, property of ‘quantity’ of industrial experts recruited described as few: dimensions ranged from ‘few’ to ‘many’. Property of ‘type of graduates’ recruited also identified from passage, dimensions: bright to stupid, best to worst, and top to bottom graduates. For industrial experts, property of ‘recognised’ assigned, giving dimension of renowned to unknown.

HBM described two routes of graduate recruitment: traditional and direct entry. Traditional: scheme approved by certain professional institutions, IMEC/IE, which give graduate programme approved quality standards. From this, property of ‘quality’ of graduate recruitment identified with traditional route, dimensions ‘quality’ to ‘inferior’ graduate entry programmes. Direct graduate entry undertaken to some extent, hence, property of ‘degree’ of direct entry identified here with dimensions ‘full’ to ‘partial’;
recruitment made at particular point in 'time', when need for 'certain type of skill' arises. Also shows property of 'time', as an occasion.

5.4.2.2 Example of theoretical and operational memo on recruitment

Theoretical and operational memo (Written from code note 'Properties and dimensions of recruitment'): Created 2/5/05

Data did not explain: Are experts and graduates only ways to recruit to develop and renew DCs? Could there be other types of recruitment, which can help develop and renew DCs? Why is expert recruitment occasional and graduate recruitment frequent or normal route? Other sources of recruiting industrial experts not known, sources of recruiting graduates not specified. Why traditional graduates brought in? Is it for specific or general skills? From theoretical memo, operational memo to describe next direction for interviews. For answers, need to talk to HR person. So interviews: HR/capability skill owners. Continue open sampling to find out other ways of developing/renewing DCs.

5.4.2.3 Locating concepts

The next stage in the analysis process was to conduct theoretical sampling to interview specific people, for example the Company Employee Executive and Head of Capability Skill Owners with the aim of finding more properties, dimensions and their interrelationships, to develop concepts and categories. However, the general question of how DCs are developed was not abandoned until the last interview. The data collected from the relational sampling was compared to the identified codes, their properties and their dimensions, and interrelated into a category. Table 5-5 below shows an example of how the concept of human resource activities (HRAs) was developed. From the data, it was identified from their in vivo patterns that some of the codes were related to each other, and their properties and dimensions were evident in the data from the words, sentences and phrases. This indicated a variety of influences and behaviour implications, but on its own could answer only a fraction of the phenomenon of creating DCs. A concept on its own only explains a part of a phenomenon and not the whole, and it unites certain influences under an explanatory conceptual heading.
In Table 5-4, the properties and dimensions of recruitment could be seen, and Table 5-5 shows how recruitment was integrated into HRAs. The concept of HRAs was identified from the codes as having explanatory power for all the people issues. Looking at the concept of HRAs, there are different types of properties and dimensions. For example, HRAs are conducted through recruiting and investing in people. Recruitment varies from recruitment of graduates to renowned experts, and investing in people varies from training to people development activities. Apart from the variations, the concept of HRAs has other properties and dimensions, listed in Table 5-5, which contributes to the development of HRAs. So, for example, recruitment will not have constituted an HR activity if it does not deal with people, hence alliance in this instance cannot be an HR activity. During the development of the HRAs concept, the codes and dimensions in Table 5-5 were compared for the presence or absence of HRAs in those data. All the properties and dimensions were then integrated to develop a category of HRAs which has explanatory power for the process of creating DCs through axial coding.
5.4.3 Axial Coding

As the codes and concepts accumulated, the researcher began to establish relationships between them. The next stage of the process was to review the codes and concepts identified so far in the analysis, noting the recurring concepts which were then abstracted and clustered in a way that indicates a relationship. Using the tree nodes in NVivo2.0, all the NVivo2.0 free nodes, properties and dimensions on HRAs were then re-arranged on a tree depicting their interrelationship to each other, using the paradigm model. Figure 5-5 illustrates the axial coding for recruitment using NVivo2.0 tree nodes.

Figure 5-5 Axial Coding: Recruitment
Figure 5-5 illustrates how the code Recruitment has been integrated with its properties and dimensions to form a concept. The purpose of axial coding is to begin the process of reassembling data that were fractured during open coding (Strauss and Corbin, 1998). In axial coding, categories were related to the sub-categories. A sub-category is a category which, instead of standing for the phenomenon, answers questions about the phenomenon, such as when, where, why, how, and with what consequences, to form a more precise and complete explanation about the phenomenon. The above open coding concepts were related to each other along the lines of their properties and dimensions. Table 5-6 shows the development of HRA category through axial coding.

Table 5-6 Category Development for HRAs

<table>
<thead>
<tr>
<th>HRAs</th>
<th>Properties</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td><strong>Recruitment</strong></td>
<td><strong>Training</strong></td>
</tr>
<tr>
<td>Graduates</td>
<td>Experts</td>
<td>Traditional and faster graduate training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Leadership training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Management training</td>
</tr>
<tr>
<td><strong>Approach</strong></td>
<td>Planned/emergent</td>
<td>Planned/emergent</td>
</tr>
<tr>
<td><strong>Quality of people</strong></td>
<td>Very best graduates</td>
<td>Recognised industry experts</td>
</tr>
<tr>
<td><strong>Amount</strong></td>
<td>A lot of graduates</td>
<td>Few industry experts</td>
</tr>
<tr>
<td><strong>Rationale</strong></td>
<td>Specific to general skills</td>
<td>Specific skills</td>
</tr>
<tr>
<td><strong>Types</strong></td>
<td>Traditional/direct entry</td>
<td>Direct recruitment</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>Internal/external recruitment</td>
<td>External recruitment</td>
</tr>
<tr>
<td><strong>Degree of usage</strong></td>
<td>Used frequently</td>
<td>Occasionally</td>
</tr>
<tr>
<td><strong>Continuity</strong></td>
<td>Continuous use</td>
<td>Used from time to time</td>
</tr>
<tr>
<td><strong>Type of medium</strong></td>
<td>Capability owners/HR department</td>
<td>Capability owners/HR department</td>
</tr>
</tbody>
</table>
As the concepts, categories and suggestions of their relationships started to emerge from the open coding, code notes and theoretical memos, and axial coding, the researcher started to put down her ideas through writing memos and diagrams to indicate the ideas and story line of the theory. In integrating the relationships, categories were linked with their sub-categories using the paradigm model of axial coding, which consists of the conditions phase, strategies, action and interaction phase, and the consequences of developing DCs through axial coding and relational statements (Strauss and Corbin, 1998). Table 5-7 below shows the axial coding developed in the study, using the axial coding paradigm model. In section 5.4.3.1, there is an example of how an axial coding memo was written using the HRAs category.

5.4.3.1 Example of memo relating to axial coding of HRAs category

Created 9/8/05: Theoretical memo - axial coding HRAs (developing category)

HRAs can be described as strategic act through which firms develop DCs. Activity which consists of bringing people, developing, training and retaining them to develop people capabilities. HR activity is a process. Condition noted in this process relates to need to bring people with ‘certain types of skills’ (specialist and generalist) into the firm, and develop and retain these skills. Strategies involve planned, proactive structured approach and continuous process to renew, maintain and develop people in firm, including procedures and processes for bringing in people and how to develop and retain people. Activities used involve recruitment, bringing people in through certain ‘types of entry’: ‘direct and traditional graduate entry’; ‘direct expert entry’ from competitors, job markets, universities, and internal movement of people. Getting people accustomed to firm operations carried out through formal and informal training schemes to train for both current and future roles. Finally, people development activities conducted to develop people throughout their career, and firm able to retain them.

Relationship between HRAs and development of DCs indicated by statement in the interview passage in section 5.4: “We have many routes to doing that. We recruit very bright top end of graduates. We occasionally bring in people who are recognised industry experts...graduate training scheme which is approved by the professional institutions...so we bring them in into a faster track training scheme”. Recruitment and training: types of HRAs: hence, HRAs one activity through which DCs are developed.
Therefore, looking at process of identifying need, bringing them in and getting them accustomed to operations, developing and retaining them is a learning experience both for firm and people and how firm develops ability to carry out successful HRAs.

5.4.3.2 Axial coding for process of creating DCs

The same process used for the analysis and integration of the categories and their sub-categories was used to analyse and integrate all the different categories and sub-categories to develop the theory of the process of creating DCs in firms. Table 5-7 below shows the axial coding relating to the entire theory of the process of creating DCs at the strategic level.

Table 5-7 Axial Coding for Process of Creating DCs

<table>
<thead>
<tr>
<th>Causal Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer requirements</td>
</tr>
<tr>
<td>Legislation</td>
</tr>
<tr>
<td>Competition</td>
</tr>
<tr>
<td>Market Changes</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Phenomenon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing and renewing DCs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intervening Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tangible and intangible resources</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interational Strategies/Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned and Emergent</td>
</tr>
<tr>
<td>In house Innovation</td>
</tr>
<tr>
<td>HRAs</td>
</tr>
<tr>
<td>Learning</td>
</tr>
<tr>
<td>Collaboration</td>
</tr>
<tr>
<td>Acquisitions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consequences (DCs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovativeness</td>
</tr>
<tr>
<td>Market orientation</td>
</tr>
<tr>
<td>Ability to manage:</td>
</tr>
<tr>
<td>Human resources</td>
</tr>
<tr>
<td>Knowledge</td>
</tr>
<tr>
<td>Collaboration</td>
</tr>
<tr>
<td>Acquisitions</td>
</tr>
</tbody>
</table>

The first part of the axial coding depicts the various reasons why firms create DCs, the next stage is the phenomenon under investigation, followed by the key resources required and the interational strategies and activities that the firm undertakes to develop DCs. The last stage is the consequences; that is, the various DCs developed as a result of the process.
5.4.3.3 Relational statements developed for theory of creating DCs

In GTM, the hypotheses of the research are generated through data analysis, and with the Strauss and Corbin (1998) approach of GTM these are referred to as relational statements. Relational statements are hypotheses which are generated from data through open and axial coding and the memos written. From the analysis, the following relational statements were developed for the theory of the process of creating DCs.

1. As a result of certain conditions such as market changes, legislation, customer requirements and competition in their operating environment, firms are challenged to develop DCs.

2. To develop DCs to meet these challenges, certain key resources are required.

3. In-house innovation, HRAs, collaboration and acquisitions, learning are the activities through which firms acquire skills, knowledge and experience, and learn from these to create DCs.

4. As a consequence of continuous development of DCs, firms are likely to develop and renew their DCs to remain competitive.

The axial coding was used as a basis to develop the relational statements through comparison of the data. All the relational statements were identified from the data. The first details the conditions under which firms develop DCs. The second is about the 'the intervening conditions', that is, the resources required for developing DCs. The third portrays the strategies and activities through which DCs are developed. Finally, the fourth relational statement depicts the outcome of the process of developing DCs.

Since these relational statements were abstractions at a conceptual level, it was important that they were validated. Further validations of the relational statements were conducted through continued comparisons of data collected with coded data. The above hypotheses were then confirmed through the iterative process of constant comparison for the continuous occurrence of the data that support the hypotheses developed. The theory and model developed confirmed the relational statements identified in the data.
5.4.4 Selective Coding

To ensure that the hypotheses were validated, and to make further sense of the theory that was developing, the categories were further integrated and refined by reducing terminologies, selecting a core category, and finding out what gaps needed to be filled through selective coding. To fill out the properties and dimensions of the major categories, the raw data were reviewed and further data were collected through discriminate sampling. During this sampling, data were collected selectively from people who will provide information required on the reduced specific categories. Previously collected data were then reviewed, constantly comparing the new data to the previous data, until no new information was coming through, hence reaching theoretical saturation. This occurred when further data collected and analysed did not yield any new concepts, properties and dimensions of the developed categories.

To be certain that the data have reached theoretical saturation, theoretical sampling to further develop categories in terms of their properties and dimensions continued. Moreover, at the beginning of each interview, each participant was asked the general question of how DCs are developed to find out if new concepts and categories would emerge from the data, but no new categories, properties and dimensions were identified. During the process of selective coding and constant comparison, memos were written and a lot of diagrams/models depicting the theory were generated. Figure 5-6 below shows an example of one of the initial models developed. The figure depicts a model of the theory of creating DCs developed from the model explorer in NVivo 2.0, and the various components of the theory were derived from the tree nodes in NVivo2.0. The numbers on the components indicate where they were located on the tree node. The emerging theory from the model explorer shows that in a bid to remain competitive in their markets, firms develop DCs. To develop DCs requires firms to combine certain key resources, strategies and internal and external activities. It also shows that developing DCs in firms is a continuous process. During data analysis, different versions of the model of the process of creating DCs at the strategic level were developed both manually and with the NVivo2.0 model explorer, until the final model was developed (see Figure 6.1 in Chapter 6).
5.4.4.1 Selection of major category, sub-categories and integration of literature

The major category of the theory was selected through a review of the memos written, and codes and concepts developed to identify which of the concepts or categories was central and had the ability to pull all the other concepts that have a relationship together, to explain the phenomenon of creating DCs. According to Strauss and Corbin (1998: 146) "A core category consists of all the products of analysis condensed into a few words that seem to explain what this research is about". Two major categories were initially identified: (1) developing and renewing DCs, and (2) developing DCs. Developing and renewing DCs was selected as the core category because it had a better substance to what was happening in the data and constantly reoccurred in almost all the data analysed. Although it was found in the lists of categories, it was also abstracted, so it can be used in developing substantive or formal theories on DCs. It has the ability to integrate the other sub-categories: causal conditions, strategies, development approaches, resources, activities, and outcomes to explain the phenomenon of creating DCs and the variations in the substantive theory that has been developed. The major category and sub-categories selected for the theory are listed in Figure 5-7 below.
At this stage of the process, the role of extant literature became very important. The literature was read to synthesise the concepts grounded in data and incorporated as sources of more data, which were compared with the existing grounded data. Literature on the process of creating DCs, internal and external approaches, planned and emergent strategies, and activities (in-house innovation, HRAs, collaboration and acquisitions, and learning) were reviewed, and this helped to improve and raise the theoretical level and improved the construction of definitions (Eisenhardt, 1989). The theory was then validated through continuously returning to the data to ascertain whether the emerged theory reflected the actual data collected. The constant comparison of data helped with the verification of the theory. Synthesising the grounded data with extant literature also served as evidence in verifying the substantive theory.
It must be emphasised that verification of the substantive theory is not as crucial as generating the theory itself, and according to Glaser and Strauss (1967: 28), "Accurate description and verification are not so crucial when one's purpose is to generate theory. This is especially true because evidence and testing never destroy a theory (of any generality) they only modify it. A theory's replacement is a better theory". Hence, the validation and verification of the theory did not ruin the substantive theory that was developed, but made it richer in terms of other properties and dimensions that emerged from further comparisons.

The theory at this stage became dense with concepts and enriched with extant literature, and hence the researcher discovered a substantive theory that is applicable to the particular area from which they emerged, in this case the process of creating DCs (Glaser and Strauss, 1967). The theory is therefore relevant to the firms concerned (Sage and Rolls Royce). However, it is also readily amenable to other firms due to the abstract level of the theory. The substantive theory developed explained the process through which in-house innovation, human resources activities, collaboration and acquisitions, and learning interplay to develop DCs in the firms.

In addition, to ensure validity of the data, the researcher has provided rich, thick details of the data so that anyone interested in transferability will have a solid framework for comparison (Merriam, 1998). To ensure the reliability of the study, the researcher has provided a detailed account of the focus of the study, the researcher's role, the participant's position, the basis for the selection, the context from which data were collected, and the process of analysis. The researcher spent time within the research setting to develop an in-depth understanding of the firm to provide rich descriptions of the firm. Finally, data collection and analysis strategies have been reported in detail with a trail of evidence to provide a clear and accurate picture of the methods used in the study.

5.4.4.2 Selective coding memo relating to story line of theory

After selecting the major categories and sub-categories, and incorporating literature, a selective coding memo and descriptive story line of the theory was written. Below is an example of the descriptive story line that was written before writing the analytical story, the substantive theory.
This study consists of 27 interviews with middle and senior managers in Rolls Royce and Sage. The two firms have sustained their competitiveness in the UK and worldwide. Sage maintains a number one position in the software industry in the UK, and Rolls Royce maintains a number two position in the aerospace business worldwide. The intent of this study was to find out how they consistently develop DCs to achieve this performance. The main issue addressed was how these firms develop and renew their DCs at the strategic level, focusing on the reasons why they develop and renew their DCs, the actual strategies and activities used to develop DCs, and the consequences of developing DCs. Since the process of developing DCs is a continuous one, the participants were able to recount what they have done and what they are doing presently to create DCs in their firms.

5.4.4.2.1 Descriptive story

The phenomenon of developing and renewing DCs was identified as both a planned and emergent activity. It is a continuous process throughout the lifecycle of the participating firms. The firms at one time or another have had certain pressures in their internal and operating environments which challenge them to constantly develop and renew their capabilities, and hence DCs, in the market they operate in. As a result of these conditions, both firms seek information, conduct certain activities, create knowledge, learn about themselves and their competitors constantly, and therefore develop certain strategies to cope with these changing situations in their internal and operating environments.

The firms constantly and continuously develop and renew their DCs through activities such as in-house innovation, HRAs, collaboration, acquisitions, and learning, to address these changing internal, operating and remote environments, and due to the continuous development and renewal of their capabilities they develop certain dynamic capabilities, which set them apart from other firms. This therefore enables them to outperform, improve or sustain their competitive position in the market. Once the DCs have been developed or renewed, the process does not end because other issues also arise during the operations of the firms, which demand other strategies and actions to react to them, hence the process of creating DCs is a continuous one.
5.5 WRITING THEORY

With the theory now developed, the next stage in the research process is writing the substantive theory. Writing up the theory under GTM can take many forms, for example a discussional or a propositional theory (Glaser and Strauss, 1967). The writing of the substantive theory of the process of developing DCs took the form of running a theoretical discourse using conceptual categories and their properties and dimensions (Glaser and Strauss, 1967). The discussion approach was selected because the intention was to cover as many properties of the categories in the discussion to explain the process of creating DCs at the strategic level using the model. This was also appropriate because the theory developed is at the exploratory stage and this can easily be translated into propositions by the reader.

The writing presented an extensive theoretical discussion of the model and its associated statements from interviews and company reports as evidence for conclusions. Data from the two participating firms were then compared to enrich the concepts, properties and dimensions on the phenomenon of the process of creating DCs. An integrated framework was then developed from the data from the two firms. From the analysis, the researcher indicated how the concepts used in writing the theory were grounded in data, and quoted statements made during the interview and from the company reports to support the concepts and categories developed. The illustration in this chapter of how the data were abstracted and integrated was not done as a proof of the GTM but rather, as stated by Glaser (1978), to show the credibility of the integration, relevance and workability of the theory that has been developed. It must be emphasised that the substantive theory developed was presented as an integrated set of hypotheses. This is due to the fact that all the concepts that were used in the model were grounded in data and as such have not been proven (Glaser and Strauss, 1967).

5.6 SUMMARY

The aim of this chapter was to discuss the process of data analysis using the GTM from open coding, axial coding to selective coding. During the line-by-line coding, categories, their properties, and relationships emerged automatically, taking the analysis beyond description and placing it into a conceptual mode of analysis (Strauss and
Corbin, 1998). The incidents applicable to each category developed were compared with the previous incidents in the same and different groups coded in the same category. About 70% of the categories and concepts developed were in vivo codes and the remainder were labels placed on categories by the researcher from the meaning the categories evoked during comparative examination of the data (Strauss and Corbin, 1998).

Memos were written about the concepts to ensure all vital information was captured with any changes which were made during the analysis stage. The nodes created with the aid of the NVivo2.0 software were used to create categories that denoted the major findings of the study. In addition, tree nodes depicting the various levels of developing DCs were created. An initial framework was created which was revised based on the findings from other slices of data. This process was repeated as many times as needed during the analysis process.

It must be emphasised that the stages of the constant comparison method were not performed exclusive of each other, they were interrelated. So open coding and axial coding were conducted at the same time when categories started emerging, and due to theoretical sampling during the analysis, integration of the theory emerged by itself through the in vivo patterns of integration in the data itself. These patterns were achieved because the questions from the previous interviews on the concepts guided the collection of data to fill the gaps and extend the theory. The researcher then selected the core category. During the analysis, data were frequently compared to the literature to synthesise the emerging theory and the integration of emerged categories with extant literature as having explanatory power for the developed theory. The chapter concluded with explanations of how the substantive theory was written.
CHAPTER 6 PRESENTATION OF SUBSTANTIVE THEORY

6.1 INTRODUCTION

This chapter presents the substantive theory developed in this study. It begins with a presentation of the model created and explanations of its various components. The second part of the chapter then focuses on a detailed theoretical discourse on these components: the reasons for developing DCs at the strategic level, the key resources required, the strategies adopted, the four main activities used, and the types of DCs developed.

6.2 PROCESS OF DEVELOPING AND RENEWING DCs

The theory addresses the question of how DCs are developed in firms, which is explained through the model developed. The objectives of this study were not stated at the onset of the research; rather, they were derived during the simultaneous data collection and analysis process. The GTM emphasises that researchers enter into the field without any preconceptions of objectives of what to study so that they arise during data collection and analysis (Strauss and Corbin, 1998). Hence, this study began with the broad area of the research question of how DCs are developed. The initial data collected were then analysed, which yielded concepts, categories and properties, and by their in vivo patterns (specific statements made by participants about concepts and categories) in the data suggested various underlying factors that influence the development and renewal of DCs. Literature was reviewed specifically to synthesise the emerged concepts and categories. The researcher then wrote theoretical memos to aid with the analytic understanding of the data collected in relation to the process of creating DCs at the strategic level. From this, the researcher developed research objectives to guide subsequent data collection through theoretical sampling. The research objectives which were derived from the data were refined through constant comparison of previous and new data, and the development of relational statements during simultaneous data collection and analysis, using the Strauss and Corbin (1998) paradigm model (see section 5.4.3.2). The researcher focused on three main objectives (see section 1.5) which related to the emerging theory. These are summarised as:
1. To identify factors that contribute to the development of DCs.
2. To determine resources required for developing DCs.
3. To describe the actual strategies and activities employed to create DCs.

6.2.1 The Model

Figure 6-1 presents the model derived from the research data which provides initial and testable explanations of the process of developing DCs at the strategic level.

Figure 6-1 Process of Creating DCs
<table>
<thead>
<tr>
<th>Components</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Improve/ Sustain competitiveness</strong></td>
<td>To remain competitive firms have to meet certain requirements: internal and external:</td>
</tr>
<tr>
<td>Used to explain reasons why firms renew and</td>
<td>Internal: Improving efficiency of firm to respond to external pressures</td>
</tr>
<tr>
<td>develop DCs.</td>
<td>External: Varies across customer requirements, industry legislation, government legislation requirements, technical requirements and competition</td>
</tr>
<tr>
<td></td>
<td>To meet these requirements, firms need certain capabilities, hence the continuous development and renewal of DCs</td>
</tr>
<tr>
<td><strong>Developing and renewing DCs</strong></td>
<td>These include; strategies for developing DCs, decision on development and renewal approach (internal/external), activities and resources to be used, and the outcome. Each of these aspects is explained below</td>
</tr>
<tr>
<td>Process through which firms continuously</td>
<td>Vary from planned to emergent strategies</td>
</tr>
<tr>
<td>develop and renew their DCs. Various</td>
<td>Planned: Business and product strategy</td>
</tr>
<tr>
<td>components of this process stated and</td>
<td>Emergent: Business intelligence, generative and adaptive learning</td>
</tr>
<tr>
<td>explained below.</td>
<td>Vary from internal to external developmental approach</td>
</tr>
<tr>
<td><strong>Strategies</strong></td>
<td>Decisions by firms whether to invest within or outside their firms to develop DCs.</td>
</tr>
<tr>
<td>Adopted to develop, renew and maintain DCs.</td>
<td>Internal: Invest in developing DCs within firm</td>
</tr>
<tr>
<td>This explains nature, types, variation,</td>
<td>External: Invest in developing DCs from external sources</td>
</tr>
<tr>
<td>amounts and degree of intensity of strategies.</td>
<td>Varies from tangible to intangible</td>
</tr>
<tr>
<td><strong>Development and renewal approach</strong></td>
<td><strong>Tangible</strong></td>
</tr>
<tr>
<td>Decisions by firms whether to invest within</td>
<td><em>Physical</em>: Infrastructure, technology</td>
</tr>
<tr>
<td>or outside their firms to develop DCs.</td>
<td><em>Financial</em>: Internal to external money, good systems</td>
</tr>
<tr>
<td><strong>Key resources</strong></td>
<td><strong>Intangible</strong></td>
</tr>
<tr>
<td>Certain resources required to facilitate</td>
<td><em>Human capital</em>: Right people, intellectual capital, integrated teams</td>
</tr>
<tr>
<td>development/renewal of DCs.</td>
<td><em>Relationship capital</em>: Good relationship</td>
</tr>
<tr>
<td></td>
<td><em>Structural capital</em>: Supportive culture, transformational leadership, time, good reputation and processes</td>
</tr>
<tr>
<td>Components</td>
<td>Explanation</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Activities</td>
<td><strong>Internal Approach</strong></td>
</tr>
<tr>
<td></td>
<td><strong>In-house innovation</strong></td>
</tr>
<tr>
<td></td>
<td>Business scope innovation: Continuous investment in technology, R&amp;D and new product, experimentation, and market developments</td>
</tr>
<tr>
<td></td>
<td>Organisational innovation: Processes and process improvements activities, business models and organisational structure.</td>
</tr>
<tr>
<td></td>
<td>Structural innovation: New business models to support customers and partners, and horizontal mergers and acquisitions</td>
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<tr>
<td></td>
<td>Human resource activities</td>
</tr>
<tr>
<td></td>
<td>Recruitment, people development activities and training</td>
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<tr>
<td></td>
<td><strong>External Approach</strong></td>
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<tr>
<td></td>
<td>Collaboration</td>
</tr>
<tr>
<td></td>
<td>Alliance: Formation of joint ventures</td>
</tr>
<tr>
<td></td>
<td>Research partnerships: Formation of university technology centres, research associations</td>
</tr>
<tr>
<td></td>
<td>External networking: Direct and third party</td>
</tr>
<tr>
<td></td>
<td>Direct: Customers, suppliers, partners and competitors</td>
</tr>
<tr>
<td></td>
<td>Third party: Committees, conferences</td>
</tr>
<tr>
<td></td>
<td><strong>Acquisitions</strong></td>
</tr>
<tr>
<td></td>
<td>Technology and skills Acquisitions</td>
</tr>
<tr>
<td>Learning</td>
<td>Knowledge creation, codification, articulation and utilisation</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Dynamic Capabilities</td>
</tr>
<tr>
<td></td>
<td>Innovativeness, Market orientation, Ability to manage: Human resource, Knowledge, Collaboration, and Acquisitions</td>
</tr>
</tbody>
</table>

Actions adopted for developing and renewing DCs. This major component explores type of activities, location, duration, amount, intensity and degree of usage, focus, variations, rationales and benefits of the activities towards developing and renewing DCs at the strategic level.
The discussion of the theory offers explanations for the internal and external conditions for firms' development of DCs. The term 'improve and sustain competitiveness' represents the first component of the model and explains the reasons why firms develop DCs. The second component of the model 'developing and renewing DCs' integrates and explains the various iterative and simultaneous process in developing them. This involves the strategies adopted (planned and emergent), the development approach taken, key resources required, and firm activities. The final component of the model is the 'outcome' of the process, which encompasses the main DCs developed in the firms examined. A detailed explanation of all the components can be found in Table 6-1 and is expanded upon in the remainder of this chapter. The theory developed from the data, and encapsulated in the model, is both iterative and simultaneous, and is a provisional conclusion in the technology industry that can be tested and refined in other industries.

The next section of this chapter explains in detail the process of creating DCs. This is presented in an extensive theoretical discourse on the model, and with associated statements from the participating firms as evidence for conclusions.

6.3 IMPROVE AND SUSTAIN COMPETITIVENESS

The first component of the model is 'improve and sustain competitiveness'. This describes the conditions for developing and renewing DCs. The participating firms in this study operate in dynamic market environments and face certain internal and external pressures to change their strategies and operations. Change poses challenges for these firms to find satisfactory ways of coping, and DCs provide such an avenue for managers. Thus, to improve and sustain competitiveness, the two participating firms in this study develop DCs:

_The demands of our customers, what our competitors are doing and then what is going on in the world of business management software all feed into it (Mergers and Acquisitions Manager, Sage)._

_Because the market is changing and one of the key characteristics of the aerospace business is that change happens very rapidly. We go through big swings in terms of the business cycle. Our customers in the airlines are losing money: The yields that they get year on year on tickets sales are going down so there are huge cost pressures in the industry (Director Technology and Operations, Rolls Royce)._
The external conditions for developing DCs identified in the data include legislative requirements, new customer requirements, and strong competition. Elaborating on the external conditions for developing DCs, the legislative requirements identified vary from government to industry, which impacts on the operations of firms. This legislation brings about new procedures and requirements that govern the operations of the participating firms. Thus, since DCs are abilities for finding satisfactory ways of coping with change, the participating firms develop DCs to meet these requirements. For example, in Rolls Royce, there are extensive environmental requirements in terms of noise, emissions and pollution, and in the words of the Director Technology and Operations, Rolls Royce:

*The environmental drivers are also huge; so, we are trying to make the aeroplanes quieter and more environmentally friendly.*

The extensive environmental requirements come through central government, local government, and the aviation industry (International Civil Aviation Authority and Civil Aviation Authority), legislation which has to be met. These environmental requirements therefore challenge the participating firms to improve efficiency and effectiveness by innovating new ways of operating. Rolls Royce therefore develops DCs to meet these environmental requirements.

Customer requirements come from the increasing and changing needs of customers in dynamic markets:

*The market has moved from being, as far as customers are concerned, technology-focused to become much more operational and financially-focused. One time ago the airlines bought engines because they looked good that they had this new technology. Now the bottom line is the macro things, so it is the price and services (Company Specialist-Design Technology, Rolls Royce).*

*I think we do have challenges, obviously from our customers and other companies (Mergers and Acquisitions Manager, Sage).*

*As our customers grow, they demand more sophisticated applications for managing their businesses, tailored to the requirements of their specific industry (Annual Report, Sage 2006).*

Due to the dynamism in markets, technology and the range of product and service choices available to customers, their demand for better products and services have increased and firms compete against each other to satisfy customers. To maintain
competitiveness, therefore, firms operating within dynamic markets have to change to meet and exceed customer requirements. The DCs have the potential to assist the firms to renew resources to create change (Teece et al., 1997; Zahra et al., 2006). The participating firms therefore create DCs to enable them to identify customer needs, develop relationships with their customers, and develop new total care services and products to meet and exceed the expectations of their customers.

The participating firms face strong competition in their markets and according to the Mergers and Acquisitions Manager, Sage, "competition definitely would challenge us to revisit to make sure we are doing the right thing". Similarly, the Head of Business Management, Rolls Royce, stated that one of the reasons why they develop DCs to change is that: "If we don't change we will die because the competitors would have moved forward, and it is a competitive cut-throat market". Due to the competitive nature of dynamic markets, which change continuously, firms have to develop DCs to enable them to either match or beat the competition to sustain their competitiveness:

The markets in which Rolls-Royce operates are highly competitive. The majority of its programmes are long-term in nature and access to the key platforms is critical to the success of the business. This requires sustained investment in technology, capability and infrastructure (Rolls Royce, Annual Report 2006).

The market for business management software solutions is highly competitive. This competition may intensify, particularly in the small and medium-sized business market, because increasing sophistication in this market segment may attract more companies to enter the market. Many companies with which we compete, or which may enter into competition with us, have substantial financial, marketing and technical resources (Sage, Annual Report 2006).

For example, the two firms in this study are in either the number one or two positions in their respective markets. However, other firms operating in these markets also strive to achieve these positions. DCs provide the opportunities for firms to create and sustain competitiveness and better address market challenges (Teece et al., 1997; Eisenhardt and Martin, 2000). In this regard, DCs provide the potential for firms to sustain and improve on their market positions despite the actions of competitors. Hence, the participating firms develop DCs to sustain and improve their competitive positions in dynamic markets.

External conditions therefore lead to changes in the dynamic markets and place immense pressures on firms to meet the changing market requirements:
It is essentially, the changing environment of the software industry we are in, and it is a very dynamic environment which continually changes. But to ensure that we can still deliver our products we have to manage that change properly (MMS Manager, Sage).

So it is not just about just meeting the legislation requirement, we are always striving to beat them by some margin to gain competitive advantage (Employee Development Executive and Head of Capability Owners, Rolls Royce).

The participating firms also strive not just to meet the changing market requirements but also to be ahead of the competition in their markets. The external pressures therefore lead to certain internal pressures which call for improvement in the efficiency of the firm to develop and renew DCs to meet the external requirements. To achieve this, managers in the two participating firms continually review and seek to improve the structures of the firm, skills of their people, technology base and firm processes through developing DCs.

To create the necessary DCs, the participating firms adopt certain internal and external strategies and activities. This leads us to the second component of the model ‘developing and renewing DCs’, which is the actual process of developing DCs.

6.4 DEVELOPING AND RENEWING DYNAMIC CAPABILITIES AT STRATEGIC LEVEL

Developing and renewing DCs is an important driver for the participating firms to improve and sustain competitiveness. Due to the external and internal challenges, firms develop DCs to compete in the dynamic environment in which they operate, as suggested by two of the managers from the participating firms:

*The market system is a matured market and we are very good in retaining our market share. It is becoming more and more competitive and one product-based argument is that our logical competitor is pen and paper but now there are a lot more small software companies. There are larger ones like Microsoft trying to squeeze us from various angles, so it is certainly becoming harder to continue to be dominant and continue to grow. So the answer to the question is 'Yes, we have to develop new strategies and new capabilities' (Technical Support Manager, Sage).*

*There is a huge amount of pressure and change out there in the market place and of course the competition is very strong. We are competing with GE and GE*
is one of the biggest companies in the world. They have far more resources than we do. So in order to stay up there with GE we have to run very hard (Director Technology and Operations, Rolls Royce).

The two participating firms seek information, create knowledge, and learn from the knowledge created to develop DCs to cope with the changing situations. Once the DCs have been developed or renewed, the process does not end, because other challenges arise during the firm’s operations which demand further strategies and actions to develop and renew DCs to respond to the new changes. The process of creating DCs is a continuous process and the participating firms constantly develop and renew their DCs to address challenges in their markets.

Developing and renewing DCs was identified as primarily an evolutionary and a learning process:

In general, I will say it is evolutionary but we just recognise that whatever we do next is going to be better, quicker than the last one (Employee Executive and Head of Capability Owners, Rolls Royce).

But you know what, we are not afraid to try things. We do try things at low cost because we do not spend a lot of money but there are other companies that do big launches. In contrast, we try little things if it does not work that is okay, so as a business we develop incrementally (Business Development Manager-Technical Support, Sage).

The process of developing DCs, therefore, is a slow incremental change in the way that DCs are transformed and how skills and know-how are accumulated. This incremental change is a learning process because the employees have to learn from the activities conducted to develop DCs, and learning takes time for the learner to grasp the new knowledge, know-how and skills. Hence, to improve and remain competitive, people in the firm have to continuously learn new work practices, improve, and adopt new ways of working. To the managers in the two participating firms, waiting for a major shake-up before taking a leap will cost the firms dearly. Thus, developing DCs in an evolutionary fashion, rather than through quick and radical changes, is the most appropriate way of sustaining competitiveness in dynamic markets.

Developing and renewing DCs in the two participating firms involves taking small to big risk, so the two participating firms have a medium to high level risk management procedure in place. The decision to develop DCs in the firms could be purposeful or
planned through corporate or individual top management enactment or emerges through the activities and operations of the firm. The nature of developing and renewing DCs in the two participating firms varies from facilitated to directed developments:

*I think it is closer to the latter (facilitation) than the former (directed). I think the role of top management, as I said, is really to inspire the firm and to set the vision for the firm. It is the role of local management to really drive local change and local improvement through the sort of process councils and the research and technology activities* (Director Technology and Operations, Rolls Royce).

*Yes, that is important, giving people ownership of their own areas to develop because a lot of the time if you just leave it to the senior managers they are obviously busy people and they don't have the time to sit back and think, 'How can I develop this area?' But if you give it to people working on it daily they can make incremental changes that help with small changes which gradually become big changes* (Product Manager, Sage).

The development of DCs is directed when the firm sets broad objectives depicting the areas in which to develop DCs. Facilitation occurs through encouraging, inspiring and motivating employees to take initiatives to create necessary DCs to achieve the broad vision of the firm. For example, in Sage, developing DCs is mostly facilitated. It is facilitated because the actual development and renewal process comes from the staff. The decision to create DCs comes from the top in the form of a broad vision, encouragement, inspiration, and support (resources and motivation from top management) to develop DCs. In contrast, in Rolls Royce, it is a combination of facilitation and direction. The two firms therefore use both planned and emergent strategies to develop and renew their DCs. This now leads us to the third component of the model, the strategies for developing DCs.

6.5 STRATEGIES ADOPTED FOR DEVELOPING AND RENEWING DCs

The type of strategies adopted for developing and renewing DCs are planned and emergent, as noted by two of the managers interviewed:

*We sort of plan ahead and look ahead. That sounds dreadfully a sort of organised almost stylistic firm. Five years from now we will have 10,000 more engineers. It is not quite like that but it flows and emerges with the demand over time* (Head of Business Management, Rolls Royce).
We have plans with our products, which say we need to do this, but fundamentally, those strategies of course get skewed by something that emerges and in quite a short-term (Product Director, Sage).

### 6.5.1 Planned Strategies

The participating firms through deliberate efforts plan the intended course of action, which stipulates the measures they intend to take to create DCs through a business and product strategy:

*Rolls Royce is organised by customer-facing business units and operating business units and we have four major markets sectors, so there is civil aerospace, defence aerospace, marine and energy and they are responsible for planning their own business strategy and product strategy. The planning involve the new products they envisage, which new developments to existing products they envisage, they will have product strategies and that defines technology capabilities because obviously technology cannot stand still (Employee Executive and Head of Capability Owners, Rolls Royce).*

*We have a company strategy for developing products and capabilities. I have a strategy for my product and that fits into the division strategy and back into the company strategy (Development Manager-Technical Support, Sage).*

The business strategy specifies details of the perceived definition of the investment (through dialogue and feedback with customers to identify the types of products and services they want) and perceived market achievements from the investments. From the business strategy, a product strategy document is developed. This defines the products to be developed and the type of capabilities required for implementation. For example, in Rolls Royce, there is a capability requirement document, which specifies the type and amount of capabilities required, and how they will be acquired. Sage does not necessarily have a capability document, but each business strategy has details of the type of capabilities required for implementation. The business strategy and product strategy define the long-term strategic intent of the firms. The business strategy focuses on the current and future fundamental requirements in the operating and remote environment in relation to the vision, capabilities and products of the firms. From these documents, the firms plan the type of DCs that have to be developed or renewed for the efficient operations of the business.
The duration of the business and product strategies in the firms vary from short-term to long-term:

Well, we basically sustain a long-term planning, what we think we are going to need against the product development side. We maintain a minimum of a ten-year business strategy at the sector level and below that we have the same at the product development level and technology level (Head of Research and Technology, Rolls Royce).

So one of the things I did when I took on the role was to define very rigorously how we should work in terms of developing individual product strategies which set a long-term goal, even for the products of three to five years. Underpinning that is the product road map that said what we are going to release in the next 2-3 years and what the features are going to be. So that we could clearly articulate to the rest of our business where everyone thought the product should be going, that sets the direction for capabilities (Products Director, Sage).

For example, Rolls Royce maintains a minimum of ten years’ long-term strategy. Within the ten-year plan, the first three years are a short-term strategy, which provides an expectation of a fairly good picture of where the business might be in three years. The next seven years is a long-term strategy, which is a forecast of what will happen within those seven years. In contrast, Sage has a long-term strategy of three to five years and a short-term strategy of two to three years.

The production of these documents is conducted in conjunction with the business groups or departments in the firms every year. The development of the business strategy, product and capability documents assist with the identification of the need to develop certain DCs. The capability document/information spells out existing DCs, those that need improvements, and the new ones that have to be developed. So it is the combination of the product strategy and the capability document/information that indicates the ways that DCs are developed or renewed in the two participating firms. All these documents then integrate key roles and functions, such as the directors of finance, product, engineering and human resources, and they have responsibility to ensure the successful implementation of the planned strategy.
6.5.2 Emergent Strategies

Although the firms in this study have planned strategies for developing DCs, most of the strategies used are emergent. The views expressed by the Vice-President Marketing, Rolls Royce, and the Product Development Manager, Sage, illustrate this:

*I think most of our strategies are actually emergent... I do not think there are very many that are actually genuinely intentional new strategies (Vice-President Marketing, Rolls Royce).*

*It is quiet reactive in nature, it is not planned. It is very difficult to plan to react because a lot of the time it is opportunity that arises and then you basically do a risk analysis, put one project on hold, and react to the opportunity considering the cost and benefits of each (Product Development Manager, Sage).*

With the emergent strategy, the intention of the participating firms to develop DCs is not deliberate. The strategy to develop DCs emerges in the two participating firms through the following actions: opportunity taking, maintaining flexibility in planned strategies, learning, and support for innovation. The next section expands on the actions for developing emergent strategies.

The participating firms position themselves to exploit new opportunities as and when they come up, and this is made evident in the strong risk management process and the variation of taking small to big risks to change capabilities in the firms. It must be emphasised here that although both participating firms take risks, it was identified that Sage takes bigger risk than Rolls Royce. The reason for this disparity is the type of businesses the firms operate. Whereas the product life cycle of Sage is short-term and thus it can take more risk to introduce many changes, the product life cycle of Rolls Royce is long-term and very costly, so risks are taken with caution.

The participating firms also maintain a portion of flexibility in their planned strategies to enable alternative strategic actions to develop DCs, as suggested by the Company Specialist of Rolls Royce:

*Yes, new things arise, but usually these capabilities are at a level that they can be linked to the existing structure somewhere.*

Maintaining flexibility demands that firms have agile business models that are flexible enough to adapt to changes in the business environment. Further, strategy emerges from
learning through various types of activities such as experimentation, developmental programmes, gradual steps, and testing:

Learning occurs by building something in a non-critical environment. So for example in electrical technologies Rolls Royce currently has several big development programmes to implement those technologies into engines and test them on the ground. Due to the fact that some of these technologies are a bit radical, they first go through the development programme on the ground in a safety controlled environment before they are put on an aircraft (Universities Liaison Recruitment Officer, Rolls Royce).

By and large, as long as people have the freedom to discuss their ideas and try their ideas. However, in trying out those ideas you need to actually understand the pros and cons of those ideas before you are able to move on with it (R&D Manager, Sage).

For example, Rolls Royce has processes such as the gated process. This incorporates learning 'stages' from the beginning of a project through to the end. At each stage, the project has to meet certain requirements to progress from one stage to another during the project lifecycle. As a result of these processes, employees learn new things from which new strategies emerge. Sage also has developmental stages for software products. Each product has to progress through the various stages to become a full product and during this process new things are learnt, and new strategies emerge. Furthermore, there is strong senior management support in the two firms. Employees are encouraged and motivated to take initiatives, which leads to emergent strategies to develop DCs. The planned and emergent strategies are implemented through the combination of key resources and activities.

6.6 INTERNAL AND EXTERNAL DEVELOPMENT APPROACH, RESOURCES AND ACTIVITIES

The next part in the process of developing DCs is the identification of the type of development approach, resources and activities to use. This is where the actual development and renewal takes place and firms learn about the type of DCs that have to be developed, either implicitly or explicitly. The participating firms have consistently invested in their capabilities and technologies over the years through internal and external development approaches to improve and sustain their competitiveness:
We develop that technology in-house or we do go out and acquire that technology by buying the skills and capabilities that another company may have (Product Manager, Sage).

The second element is that we have invested consistently in technology and capability. By that, I mean we have kept up our level of investment organically, and with partners and with universities, in the technologies that enable us to be successful. Secondly, we are investing consistently in the capability that exists both in our domestic manufacturing and in the supply chain (Chief Executive Officer, Rolls Royce).

Within these two development approaches, four types of activities for developing and renewing DCs emerged from the data. These were in-house innovation, human resource activities, collaboration, and acquisition. These fall into the categories of internal (in-house innovation, human resource activities) and external (collaboration, acquisition) activities. The decision to use either the internal or the external development approach depends on the following factors: (1) availability of resources which include: physical, and financial resources, and human, relationship and structural forms of capital, (2) time, or how soon the particular DC is required, (3) cost: monetary and opportunity cost, (4) the merits and demerits of carrying out the particular development, and (5) availability: whether the capabilities can be developed internally or can be obtained from external sources. From the analysis, it was identified that if it is too costly and time-consuming to develop the DCs required internally, then the firms mostly collaborate with and/or acquire other firms for specific skills, technology or processes required, depending of course on availability. From the model, the development and renewal component involves the combination of tangible and intangible resources and activities to develop DCs. The next component is the identification of the key resources required.

6.7 RESOURCES REQUIRED FOR DEVELOPING DCs

The next part of the process is the combination of resources and activities. The key resources identified as vital for developing and renewing DCs vary from tangible to intangible. Intangible resources were identified as fundamental to the development and renewal process. Some of these resources required are developed during the process of creating DCs, whilst others were available at the outset of the process.
6.7.1 Tangible Resources

The tangible resources used were physical and financial. These include good infrastructure, good equipment, and a variation of internal and external sources of funding.

6.7.1.1 Physical resources

The types of physical resources used were good working environment, particularly an open plan office environment and training facilities. The firms also need good equipment which includes the latest network of computers, state of the art technology, and efficient systems. The statements from some of the interviewees support this view:

*As a company we need manufacturing resources. We need the equipment that allows us to make turbine and fan blades.* (University Liaison Officer, Rolls Royce).

*They have a great working environment. They have a gymnasium, three great restaurants, coffee shop, and free bus service to and from work. They have lots and lots of advantages and their workstation is fantastic. They have high tech, everyone is on e-mail, which is not rare for a technology company, but rare for a FTSE 100 companies. So everyone is on e-mail and everybody has access to the latest technology* (Director HR, Sage).

For example, Rolls Royce has an expensive ‘engineer’s playground’ for training engineers, experimenting and testing aircraft in a non-critical environment. The facility for testing and experimentation of aircraft varies from Rolls Royce-owned to bought-in or outsourced from around the world. Good working environment, testing sites and equipment help in sharing best practices, networking and motivation, and create a strong sense of companionship amongst staff. This promotes learning and innovation which encourage the development of DCs.

6.7.1.2 Financial resources

The financial resources used by firms to develop DCs were internal and external sources of funding. For example, Rolls Royce uses both internal and external sources. Internally, money generated from the businesses of Rolls Royce is re-invested into the business again. Externally, money is generated through funding from government agencies, research funding and loans. Sage mostly uses money generated from its
businesses to fund its development and renewal of DCs. To develop DCs the firms invest in their human capital, technology and firm processes, hence they need money to be able to invest. Therefore financial resources are important in the process of creating DCs:

*Being able to finance those programmes is important, so having a business that generates enough cash and profits so that we can actually self-finance these projects. Also, having access to external funding, so we access Defence Training Rationalisation Project (DTR) money, Ministry of Defence (MOD) money in the UK and increasingly we are looking for worldwide access to funding, so we get funding from America from the US government, and funding from Germany. So that is why it is important to grow our business because we can actually access funding worldwide (Head of Strategic Research, Rolls Royce).*

*Maintaining the financial health and stability of our business operations is our primary strategic goal, allowing us to reinvest in our core businesses and pursue appropriate acquisition opportunities (Sage, Annual Report 2006).*

All the activities for developing DCs involve some form of investment. For example, to acquire other firms and hence their capabilities requires money. The acquiring firm also has to invest in learning processes to transfer the capabilities acquired to enable their staff to learn. Therefore, firms need a high proportion of money to invest in R&D, R&T, HR activities, collaboration and acquisitions to develop DCs at the strategic level.

### 6.7.2 Intangible Resources

Intangible resources for developing and renewing DCs in firms include human capital (right people, integrated teams and intellectual capital), structural capital (supportive culture, transformational leadership, time and processes), and relationship capital (long-term good relationships with customers and partners). These intangible resources are explained in the next section.

#### 6.7.2.1 Human capital

Having the right people, integrated teams and intellectual capital is important for developing DCs:

*Obviously, people in general, you can not be in the business we are in with just a thousand people. it is simply not enough and obviously people with skills (University Liaison Officer, Rolls Royce).*
Really, I will say it is people (R&D Manager, Sage).

I think the most important thing is the people, the culture and the attitude. I think with the right culture, the right attitude and putting the right people in, Sage would constantly renew itself (Mergers and Acquisition, Manager, Sage).

The human capital is important because at the heart of all the operations in the firm are people. It is people who develop and use the technology and processes developed to achieve efficiency and performance in the firm. To develop DCs the firms need people, but it is not just any people. They need certain types of people with certain characteristics, attitudes and qualifications and from the analysis this was designated as 'having the right people':

I think having the right people with the right capability (Chief of APSD Civil and APSD Team, Rolls Royce).

Right people tend to be very high up on the list (Vice-President Marketing, Rolls Royce).

You need people but you need the right people. In here, we need people who generally have interest in research and technology (Senior Electrical Engineer, Rolls Royce).

We need very good people in-house in technical professional knowledge and those kinds of things but also international type of capability (Head of Technology, Rolls Royce).

I suppose we have a lot of domain expertise as well as the business expertise in the firm, we have domain experts in terms of chartered accountants (MMS Manager, Sage).

We need other people, technical people; we need R&D people who are able to understand the domain of software engineering, and how to build software. We also need people who understand how people use software, what is best practise in terms of how to develop a user interface, for example (R&D Manager, Sage).

'Having the right people' means that the two firms have bright and experienced people with generalist skills, such as management and project management skills, to specialist skills, with technical and professional knowledge. 'Having the right people' also means having a qualified workforce, highly educated engineering teams, technically knowledgeable and competent people. In addition, the people in the two firms have positive attitude towards their work:
We have a very strong and proud workforce throughout and we have a very strong self-belief in this company. I bet it is not arrogance, I think in the past it might have been seen as arrogance but that is gone away and it is certainly pride in working for this company (Head of Business Management, Rolls Royce).

It is one where because a lot of people have worked here for a large number of years there has been a pride and the pride is a sort of local pride which is for a Newcastle company, and as people from Newcastle we are proud of where we work (Mergers and Acquisitions Manager, Sage).

Both firms have a proud and strong workforce who take interest in their work and have a very strong self-belief in what they do. This positive attitude motivates them to give their best. Human capital is a very important resource to develop DCs because all the activities to develop DCs are conducted by the people in the firm and they learn from these activities, which enables them to improve upon their skills and capabilities which, in turn, also strengthens the level of human capital.

6.7.2.2 Structural capital

Structural capital identified from the data for developing DCs includes supportive culture, transformational leadership, time, and supportive reward and incentive systems.

Culture plays an important part in the implementation of change in a firm. Culture on its own is often not directly associated with profits; however, culture impacts upon many different parts of the business as a whole so that it has a very significant effect on performance through these interactions (Johnson et al., 2005). From the data, it was identified that developing and renewing DCs requires a healthy supportive culture:

Basically different companies, I am sure, could determine and develop new capabilities but whether those new capabilities will actually succeed or flourish to my mind is a function of your company culture and what your company actually wants (Director Technology and Operations, Rolls Royce).

Since DCs involve change, it is important to have a culture to support the incremental changes that need to be made and the culture of the firm must have certain characteristics for developing DCs:

So, I think culturally, it is a company which is built on entrepreneurial spirit (Business Development Manager-Pay Roll, Sage).
I think the culture is quite an open one. It is one where people's viewpoints are listened to (Mergers and Acquisitions Manager, Sage).

Our culture is agility, innovation, customer insight, and people insight. Primarily we have five things, to trust, innovation, agility, and then people and customers, which is fantastic, they are very clear and very direct (Director of Human Resource, Sage).

To develop DCs, therefore, firms need to have cultures that reflect characteristics of a strong supportive culture. The strong culture for developing DCs should be open and integrated, entrepreneurial and risk-taking, resource-focused, empower people, foster a feeling of belonging, and engender right attitudes and behaviours with commitment on the part of both management and employees to change to meet the dynamic environment within which they operate. It should be a culture that cultivates strong senior management support for change with the right resources (commitment to work, gives ownership, financial support, and physical support), time and effective organisational structures (matrix and flat structures) that foster teamwork, and clearly defined procedures. The culture should be flexible and adaptive, which recognises and rewards employee efforts and, in particular, identifies and develops potential highfliers in the firm. Having a supportive culture leads to a common purpose, common message and common work practices in the firm. This fosters goodwill and brings people together to champion a cause and, in this case, championing the cause of developing DCs in the firm.

Leadership is vital to the DCs' development process. To develop DCs, firms need a transformational leader who has a clear vision and cultivates strong senior management support for change with the right resources. The transformational leader should be strong, supportive, inspirational, motivational, open, honest, charismatic with excellent interpersonal skills, and a desire to succeed. Particularly, the CEO should be an international businessman, a diplomat, a good businessman who has expertise in technical and management areas, and who can lead the firm through good and bad time cycles. Some of the managers interviewed stated the characteristics of leadership appropriate for developing DCs at the strategic level:

The style that I think is probably most effective in a CEO is somebody who really has a clear vision and can communicate that effectively and can build around themselves a team which is capable of delivering. Those are the key
characteristics in many firms that are going to be successful (Director Technology and Operations, Rolls Royce).

So I will say you need a diplomat, good financial guy, and you need a good individual overall leader. Charismatic leaders, we have a number of them. We have Sir John Rose (CEO), we have Phil Hopkins, and we have a number of guys who are very charismatic. So, these are very good leaders who have very good interpersonal skills and can also get the message down to the troops (Chief of APSD Civil and APSD Team, Rolls Royce).

He has to be somebody who can inspire the firm. We have had a fairly recent change of our Managing Director within the UK and the result had been a change in culture and a shift towards transformational leadership, which is now a key phrase within Sage (Mergers and Acquisitions Manager, Sage).

Another thing you need to make it work is a very strong regional leader. We have three regions, the UK, mainland Europe, and US or North America. Each of these has a very strong, very experienced CEO, who has been in the industry for a long time and has all the attributes: products attributes, personal attributes, other industry experience, and without that it would not work (Director Investor Relations, Sage).

We know what is happening this year, next year and the year beyond, but I think we have a leadership who clearly defines the strategy of how we want to grow the business and therefore puts something in place to make it happen (Manager Technical Support, Sage).

The benefits of having transformational leadership with these characteristics for developing and renewing DCs are varied: (1) the leader sets the agenda for change and the development of DCs involves change, (2) the leader gives direction to the development of the DCs through the operations of the business, (3) leaders help build teams, engender effective communication, and inspire people in the firm, and that gives the leadership team the ability to execute the strategy that they formulate together.

From the analysed data, it was identified that having a supportive reward and incentive system in the firm plays an important part of the process. Maintaining and retaining your people is key to the continuous renewal and development of DCs. The participating firms have a supportive reward and incentive system, which includes both financial and non-financial rewards. For example, a manager comments on the firm’s reward structure, which motivates its staff:

I think one of the things I said to you earlier is that effectively we have a reward structure as well. So there is also the motivation of “I want to learn more” (Manager Technical Support, Sage).
The financial supportive reward system ensures that people recruited into the firm are rewarded appropriately, paid good or performance-related wages, given the right resources to work with and are recognised for their efforts. Non-financial rewards imply caring for the staff, giving them a comfortable working environment, developing them, and giving them career progression opportunities. The employees are motivated through empowerment, recognition of their contributions to the performance of the firm, given ownership and the opportunity to use their own initiative. In the words of the Senior Electrical Engineer, Rolls Royce:

*People are extremely motivated; you find that the sickness levels and absence levels in Rolls Royce are almost zero. People work much more than they are paid and they work more than they are paid because they are interested in what we do and the technology...but also engineers love to play with things of technology. If you treat them well and give them both things, they will stay; people very rarely leave Rolls Royce.*

Motivation therefore assists employees to develop their skills and take on more challenges, which helps with the development of DCs and leads to greater performance in the firm. In both firms, there is a clear career development structure for the employees and development programmes are set up for every individual in the firm. Potential high fliers or talents in the firms are also recognised and developed accordingly. The reward and incentive system leads to winning commitment from staff and, in turn, the retention of the firm’s intellectual capital. In dynamic markets, the pool of knowledge, especially tacit knowledge, is important and must be maintained. Therefore, having motivated and retained staff with the right knowledge, experience, skills and expertise enables the continuous development and renewal of DCs in the firm.

### 6.7.2.3 Relationship capital

Relationship capital is another important resource for developing DCs. The relationship capital required is long-term good relationships with customers and partners. The firms depend on their customers and partners to develop their business:

*We depend on customers. Without them, we would not have a business (Business Development Manager-Marketing, Sage).*
I guess it is our business strategy looking at how our market works and talking to the customers (Head of Strategic Research Centre, Rolls Royce).

Another way of getting capability is getting close to your customer that is a good way of doing business (Vice-President Corporate Venturing, Rolls Royce).

According to the firms, the key thing in the operation of the business is an understanding of what makes your products and services valuable to customers. The participating firms therefore get closer to their customers and markets to be able to gain knowledge of their products and services, and to identify and understand the value they give to customers in relation to what others are offering. This therefore allows managers to predict the changes to develop the necessary DCs to meet the changes in markets and customer value.

Long-term relationships with customers give the firms feedback on what the customers and partners would like to see in their products and services. This assists firms in adding real value through developing new products, managing their brand, and introducing new business models to serve customers’ interests. The Business Development Manager, Marketing, noted that Sage builds long-term relationships with their customers which assist them to stay in business:

We depend upon them to stay in business, depend on them to be loyal to Sage, and that they continue to remain satisfied with us. They will carry on using us, but also, they will go on and recommend us to other people.

Therefore, through long-term relationships with customers Sage builds trust, loyalty, and retains customers who eventually recommend Sage to others, and that leads to revenue flow and improved performance in the firm. With revenue flow, the firm is able to invest to develop DCs.

From the findings, managers use both tangible and intangible resources, which include physical and financial resources, human, structural, and relationship capital to assist with the development of DCs. These resources are combined with certain activities to develop DCs. The next section discusses the various activities the firms employ for this.
6.8 ACTIVITIES FOR DEVELOPING AND RENEWING DCS AT STRATEGIC LEVEL

Developing and renewing DCs in the two participating firms involve the combination of the key tangible and intangible resources and firm activities. The amount, form, and types of development adopted vary. From the analysis, two main types of development were identified: internal and external. The Business Development Manager, Rolls Royce, explains how the internal and external developments are conducted:

It will be partly a mixture of bringing people from outside, partly a mix of acquiring businesses, and partly a mix of using more training programmes. It has to be a mix of all of those, there is no one particular way of doing that.

Within these two types of development, four main categories of activities of how the actual process of developing and renewing DCs also emerged. The internal activities are in-house innovation and human resource activities. The external activities varied from collaboration to acquisitions. A manager commented that these activities are conducted with a focus on developing and renewing capabilities that impact on the technology, people and processes of the firms:

So you need to focus on that. Remember what I said, people, process and technology, and the key is you have it in sight and because you have different changes happening, you need to pay attention to that and without that, I am sorry, you are going nowhere (Vice-President Corporate Venturing, Rolls Royce).

It has to be emphasised that each type of activity used varies according to the type of DCs that are being developed or renewed. The four categories of activities are explained in turn under the headings ‘internal’ and ‘external’ developments.

6.8.1 Activities: Internal Developments

Internal developments of DCs occur when firms use only in-house resources, skills and capabilities to develop DCs. The rationale for adopting an internal development approach is to invest internally in areas where the firm is lacking and to develop DCs. The two participating firms in this study go through a series of steps to develop DCs internally. These include planning, investing in the required DCs, developing new initiatives, recruiting experienced people, and monitoring competitors’ operations.
Internal development of DCs is a continuous process, and usually involves heavy investments. The Mergers and Acquisitions Manager, Sage, and the Chief Executive Officer, Rolls Royce, commented on this:

*We are always investing internally in R&D. We have a big R&D spend every year but the way I would maybe typify it is that we have R&D activity within the business, which is very much based on a specific and a known roadmap which is 1-3 years (Mergers and Acquisitions Manager, Sage).*

*We continue to invest in technologies, products, people and capabilities with the objective of broadening and strengthening our product portfolio and improving our efficiency (Chief Executive Officer, Rolls Royce).*

Adopting an internal approach to develop DCs depends on the following factors: availability, time, cost, and the merits and demerits of using the internal approach. The firms use physical and financial resources, and human, structural and relationship capital to invest internally. It was identified that the firms tend to use the internal developments to create DCs more than the external developments. The duration of internal developments varies from short to long-term, ranging from 1 to 3 years short-term to as long as the firm exists. Two main types of activities were identified with the internal development; these are in-house innovation and human resources activities. The sections below give details of how each of these activities is conducted to create DCs.

### 6.8.1.1 In-house innovation

In-house innovation is one of the activities through which DCs are developed and renewed. The Company Specialist, Rolls Royce, and the Director of Human Resources, Sage, note this:

*Well, I think innovation is one of the things. I think innovation is sort of in the company DNA, in that Royce—one of our founders—has been in 300 patents. So the whole idea of invention, I mean to bring that to market has been there right from the start. Also in 'Management Today' magazine, they do the most admired companies thing for UK companies across 220 UK companies across 22 markets..... They have various criteria and one of them was capacity to innovate... we were the top engineering Technology Company (Company Specialist, Rolls Royce).*
I would say the innovation that we foster and nurture. I think we allow people to be innovative...... So I think innovation is one of our major capabilities (Director of Human Resources, Sage).

Similarly, the statement in the Sage annual report 2006 confirms this:

_We are committed to exceeding customers' evolving needs. We aim to be first to market with creative solutions to our customers' challenges and take an equally innovative approach across all other aspects of our business model._

The rationale for conducting in-house innovation is to develop the ability to innovate and the ability to be competitive by bringing new products and new business models to market, and to gain first mover's advantage. In-house innovation is geared towards learning both generatively and adaptively (De Wit and Meyer, 2004) in the firms. This involves generating new ideas through experimentation, rapid learning and feedback, which leads to the development of skills and innovativeness in the firm. In the firms, learning generatively emerges from any part of the business.

To create DCs through in-house innovation requires that the participating firms have:

(1) A culture that fosters innovation and a passion for innovation. This should be an entrepreneurial culture created in the firm where employees are willing to try new things. The analysed data in this study demonstrate that the culture of innovation is embedded in the context of the two participating firms, and both have an entrepreneurial-type culture. (2) The right type of people and integrated teams with a high-level of creativity to innovate. To ensure that the people and integrated teams innovate, the firms must provide them with the right environment. The right environment for in-house innovation in the two firms is exemplified in processes such as the gated process, procedures for product development, business models, the ownership and empowerment of staff, the commitment of senior management, and transformational leadership at all levels of the firm to ensure effective innovation. (3) Relationship capital which gives them feedback on their products and services to assist with new innovation to satisfy their customers. (4) A management team to manage in-house innovation effectively. Management of in-house innovation is a very important aspect of creating DCs, and it was identified from the analysed data that dedicated project teams manage in-house innovation to ensure that projects are in accordance with budgets and timescales. (5) Flexibility in their structured approach for innovation. Managers in the two firms maintain a moderate to high degree of flexibility in their
structured approach towards innovation. This allows the firms to change the course of a project to incorporate emergent ideas and changes during the innovation.

Innovation is risky and the level of risk varies from moderate to high risk. As a result of this, both firms have a very strong risk management process in the business. The type of risk management identified from the data varies from a semi-structured to a structured approach, depending on the nature of the business and product lifecycles. For example, Sage has a semi-structured approach to risk taking and normally takes high level risks. This is attributed to the frequent changes that occur in its markets and product lifecycles; the long-term life cycle is 3 years, and the cost involved compared to Rolls Royce is minimal. On the other hand, due to the long-term nature and the cost of products, Rolls Royce has a structured approach to risk and, as a result, takes rational calculated risks. Taking rational risk in Rolls Royce involves innovating in areas that have direct benefit and usefulness to the current and long-term future of the business:

*I would say rational risk and rational opportunities which I am encouraged to do. What rational risk means is that we would not work on things that are not likely to be useful for the business even in the long-term future. So, for example, it is unlikely that Rolls Royce would be selling household bleach. I am not going to work on anything to improve household bleach. So when we are looking at things although they might be quite 'wacky' in terms of our current product portfolio, we are still looking at things that may be within the Rolls Royce thirty-year time plan (University Liaison Officer, Rolls Royce).*

The degree of conducting in-house innovation to develop DCs takes the form of incremental, revolutionary, or both. For example, the Company Specialist (Rolls Royce) noted that Rolls Royce tends to use more of an incremental approach than a revolutionary approach because incremental innovation can be managed within the existing firm structures and less risky for a high cost industry like Rolls Royce. However, a revolutionary innovation demands drastic changes within the firm structure and products, hence using more of that can be very devastating to Rolls Royce business. In-house innovation is very valuable to the firms because it affords them the ability, first of all, to develop new things and, secondly, through a continuous process of innovation, the firms develop DCs.
Three different types of in-house innovation were identified from the data. These are business scope, organisational and structural innovation\textsuperscript{12}. The sections below explain the three types of innovation in detail.

6.8.1.1.1 Business scope innovation

Managers make consistent investment into developing their technological capabilities, markets and products within business scope innovation. The rationale for making investment in their business scope innovation was identified as part of the firms' strategy to grow the business, develop DCs, and sustain competitiveness. Developing new products, business units and markets are therefore very important for their businesses and very crucial for developing DCs. The business and product strategies developed indicate how the business scope innovation will be carried out. There is a formal process associated with such innovation in both firms. Business plans are developed as agreement to either launch a new product or service or develop an existing product or service. This plan enables the firms to understand the requirements to deliver the product or service and the expected returns on investment. Business scope innovation is carried out organically through research and development (R&D), research and technology (R&T) and new product developments (NPD):

\textit{Well, I suppose one of the things we have tried to do is that we have had a consistent R&D strategy in terms of developing our core gas turbine technology and then applying it across the many markets for marine, defence (Company Specialist, Rolls Royce).}

\textit{It is through product development, having specialists within the firm who are sort of always going on about and aware of the latest developments in the field, whether they are within our competitors or through information on searches on patterns in both UK and abroad (University Liaison Officer, Rolls Royce).}

For firms like Rolls Royce and Sage operating in dynamic high technology industries, investment in R&D, R&T and NPD are crucial to their performance and competitive positioning. This is made evident by some of the investment they continue to make:

\textsuperscript{12} The three types of innovation were labelled from literature (e.g. Fitzroy, 2005) based on the explanations given by the interviewees of the types of innovation that assist them to develop DCs at the strategic level.
We reinvest on average 30% of our software revenues into research and development. Through continued innovation in our products and services, we strive to meet our customers’ needs more effectively than our competitors, driving our future growth. Continued strength in our core businesses is an essential measure of our success in meeting the challenge of product innovation, which is shown by our consistently strong rate of organic revenue growth, excluding contribution from recent acquisitions (Sage, Annual Report, 2006).

Over the past five years we have invested more than £3 billion in research and development. We invest on average £30 million annually on training, and the Group invests £200-£300 million every year in capital projects (Chief Executive Officer, Rolls Royce-Annual Report, 2005).

To develop DCs through the business scope innovation, the participating firms make investments in R&D and R&T, and monitor competitors to identify new developments in their markets. The R&D, R&T and NPD activities conducted to develop DCs can be large-scale or small-scale.

In addition to investment in R&D, R&T and NPD, the firms have a very solid research base which ranges from strong strategic research centres to R&D departments. According to the Chief Executive Officer, Rolls Royce:

We clearly also invest a lot of money in research and development and that is focused on improving the characteristics of our products, both from a performance and environmental perspective.

Rolls Royce has a strong strategic research centre and R&D department, whilst Sage has a strong R&D department. The strategic research centres and R&D departments are responsible for generating new ideas in technology and potential new business opportunities. There is a huge cost implication in R&D, R&T and NPD investment. Both firms have big budgets and the sources of funding for R&D, R&T and NPD vary from internal to external sources. For example, Rolls Royce uses funds from both internal and external sources, such as the EU, the DTI, and other funding agents to obtain the necessary money to invest in the firm that they could not normally afford. Rolls Royce has a central group within the engineering team and is responsible to obtain matching funding that they cannot afford to spend on R&D, R&T and NPD investments. As a result of both internal and external funds, Rolls Royce makes bigger investment in its R&D and R&T, which it could not have done with Rolls Royce private invested money alone. Sage, in contrast, uses mostly internal sources of funding. The
internal and external funding enable firms to invest in R&D, NPD, specialist skills and experimentation.

Business scope innovation follows a developmental procedure to ensure that the requirements of the programme are being met both in terms of technical specification, timescales, budget, and the resources to deliver the programme. To ensure this, the firms have quality functions and many group quality procedures in engineering. The Vice-President Corporate Venturing, Rolls Royce, gave an example of these procedures:

'Create customer solutions' is effectively a large cycle management for project and services. So it goes from when you have an idea of what you are trying to do all the way up to when you need to dispose of it... So it has been successful for us, making sure that we know how to develop engines, for instance, which are very complex items.

Create customer solutions is a project review procedure in which a project is allowed to progress to the next stage only if it meets the requirement of the previous review gate. This procedure allows the firms to monitor and control the effectiveness of investments they make. The firms also use procedures such as experimentation, demonstration and testing to ensure the efficiency of a product when implementing a new technology into a product or developing a new product. Through experimentation, demonstration and testing, new things emerge, problem areas are tackled, and exit routines are carried out to discard any part of the project that is not functioning properly, to ensure efficiency.

The firms also assess competitors continuously to measure their competitiveness relative to others. The Head of Business Management, Rolls Royce, explained why and how this measurement assists the firm:

*We do try and measure relatively where we are competitively to GE and Pratt and Whitney, and other competitors. So that process basically gives us an ongoing year on year investment in technology. Overall, it works pretty well, we have come from number three to number two, so we are in a position at least relatively speaking competitive to other people.*

The firms monitor competitors in their industry very closely to identify what new technologies they are developing. Monitoring competitors serves as a source of intelligence to know where the firms are relative to competitors. As a result of this, the firms can invest in areas where potentially they have fallen behind, as well as invest in
developing their capabilities in an effective way. Through consistent business scope investments the firms generate new ideas and improve upon existing ones. They develop new ways of conducting business scope innovation, gather experience, and improve upon their skills for conducting and managing innovation, which leads to the creation of DCs such as the ability to innovate.

6.8.1.1.2 Organisational innovation

Organisational innovation involves the development of agile business models, organisational structures, business processes, and process management activities for the effective operation of the business. Managers in the firms conduct organisational innovation to develop and renew DCs. This takes the form of internal innovation of structures and processes to support the efficiency of the business scope innovation. The rationale for carrying out organisational innovation is to ensure the continuous efficiency and effectiveness of the internal firm structures, the business processes of the firm, and to develop and renew the ability to manage the business processes. The types of organisational innovation carried out involve the creation of organisational structures, business models, business process management initiatives, and people processes.

One of the organisational innovations is the development of organisational structure. From the analysed data, this can take the form of a matrix to a devolved flat organisational structure:

*The structure we have now has been quite stable for some time now, let's say a period of about 10 years, and the structure was brought in fairly soon after John Rose became CEO and it is probably his structure, but it has been very successful in the sort of products and markets that we work in. We have acquired I guess more variance on the main structure model that we have through all our businesses, and that seems to work quite well where we have customer-facing elements and operational elements supplying into those customer-facing elements (Head of Strategic Research Centre, Rolls Royce)*.

*It is quite a flat structure which is open and quite relaxed, not too many hierarchies, not too much difference between senior managers and people that work on the telephone (Marketing Manager, Sage)*.

The matrix organisational structure assists with the integration of functional specialisation with marketing and services. According to Hankinson (1999), *"This*
structure is based on a dual chain of command which aims to achieve an equal balance of power between the vertical and the horizontal linkages of a company”. The matrix structure essentially has a duality of emphasis, where there is a twin reporting relationship to ensure the complex application of resources. It also involves building multifunctional teams, which influences and impacts on the products of the firm. The multifunctional team ensures the optimisation of the capability of the product to perform and contribute to achieve the goal and profits of the firm. The matrix structure assists the development of DCs through the formation of teams that bring into the firm common ways of working, the same set of processes and teamwork approach towards work with stronger alignment of meeting customer needs. It ensures that feedback is taken and re-integrated into the matrix structure and utilised.

The flat structure, on the other hand, is organised around work processes rather than functions. It involves a shift from vertical decision-making to horizontal collaboration and cross-functional cooperation (Hankinson, 1999). The firm uses this structure to create independent small departments and businesses that can rapidly respond to customer needs and/or adapt to prevailing changes in the business environment (Daft, 1998; Hankinson, 1999). The flat structure involves a shorter chain of command and usually a wider span of control. It has only one or two levels of management and emphasises a decentralised approach. The flat structure assists the firm to develop DCs because managers tend to have a more personal relationship with their employees and involve them in decision-making, which brings new ideas. It is more flexible, more adaptable to a participative form of management, and less concerned with a clearly defined structure. In the words of the Chief Executive, Sage, in the 2004 Annual Report:

Our devolved organisation strategy is based on nurturing the entrepreneurship, innovation and team spirit of our people, allowing us to leverage the power of local expertise.

This enables the firm to be open to the environment in order to capitalise upon new opportunities that arise in the operating environment. Both structures encourage the creation of business teams to tackle specific projects, which benefit from individual skills and experience to develop DCs.
Another form of organisational innovation is the people process innovation. The people process is a formal, structured and continuous process which assists the development and renewal of the skills and expertise of people in the firm, and in turn the development of the ability to manage people in the firm. The first step of developing the ability to manage HR is having established people processes for conducting HRAs. The Director of HR, Sage, notes this:

**So I work on four people processes with ten management routines. The processes are absolutely all about who we appoint, that is externally driven or internally driven, so our internal talent line or our external talent line.**

The type and characteristics of the people process innovation focus on approaches to recruitment, development of people, training, succession plans, and a supportive rewarding system which varies from financial to non-financial rewards. Succession processes involve innovating systems for identifying talented young leaders in the firm and developing a policy of traditional to parallel career progression routes, which motivates and encourages professional growth of employees. For example, Sage innovated a people process, referred to above by the HR Director, based on four people processes and ten people management activities. The four people processes are: (1) appointing the best people, which is externally driven or internally driven: the internal talents that Sage already has or external talents that are yet to be captured, (2) developing recruited people to be the best, and that is done through development and training, (3) rewards and recognition: Sage has developed a reward and recognition system that pays best salaries and nurtures staff by recognising their efforts, and (4) communication and involvement, keeping people informed of internal and external movements and the direction of operations of the business. The people process innovation enables the firm to recruit the best people, acquire skills, motivate employees, and develop people in the firm, which leads to the development of intellectual capital and the ability to manage HR.

Rolls Royce also has a structured people process approach for developing its people, called capability skill ownership:

*Well, we do have a structure in place to help with that. We have what is called capability owners and skill owners. So these are senior people and processors who own capabilities and processes and skills, and their job is to maintain and develop them (Company Specialist, Rolls Royce).*
It is a proactive, formal and continuous process to develop, renew and maintain the capabilities of the employees in the firm. The capability skill ownership scheme is geared towards the internal growing of core skills of aerodynamics, aero-thermal, stress, turbine blade, fan design, and combustion specialists over a long period of time to reach the level of competence of specialists. It also involves external recruitment of world experts in some of these specialist areas. The capability skill ownership scheme is divided into twenty-one different skill groups and a senior person called the ‘capability skill owner’ heads each capability skill:

So what we have identified are those people who are senior individuals around the company as the skill owners for a particular skill, and it is their responsibility to look at the health of the population of that skill right across the company on a regular basis to assess whether we have got capabilities in those people, whether there is additional training they need, whether we need to be recruiting because our mix of ages and capabilities are becoming misaligned (Director Technology and Operations, Rolls Royce).

The capability skill owners are individuals with a strong reputation in their particular field. The skill owners serve as a kind of a professional anchor to the firm to ensure that it has sufficient capabilities in each area to meet the firm’s future requirements. The process through which the skill owners ensure that there are sufficient capabilities is through the identification of skills needed, whether they have the right type of skills required internally, and whether they have the right age profile in the firm. The Head of Capability Owners comments on the role of the capability owners:

It is definitely a combination of different skills, and again that is one of the things the company skill owners support process with. This is because we do get into quite a detailed definition within the skill group, the different types of skill that are required, and therefore we ask them to build up a picture of what those skills are, what we have, what quantities and where we have them.

The capability owners then carry out a detailed definition of the type of skills required and how the firm intends to acquire them. Replenishment comes from skills of graduates and world experts through recruitment, people development activities, and acquisitions. The outcome of the capability skill ownership scheme therefore leads to skill acquisition and opportunities for career development, which assists the continuous development and renewal of the ability to manage people in the firm.
Further, the firms create succession plans to develop the careers of their people. For example, Sage operates the single normal management route, whereas Rolls Royce has developed a parallel succession route, both management and technical. Rolls Royce, about 15 years ago, recognised that people may not always follow the traditional route of group leader, section leader and manager. Rather, many people will actually become in-depth specialists as they go through their career and might move between being a technical specialist at one point, and being a manager at another. So, it established a technical ladder, which is a parallel route to the traditional management framework of leadership. The Senior Project Engineer APSD explained the career structure in Rolls Royce:

*In Rolls Royce, because we have a technology structure, you can be more qualified than your boss because you can work up the technology ladder and become a star through a number of stages: base, advance, principal, and then it goes to P2, P3, star, and then fellow, which is another thing you can get awarded. The fellow is another sort of accolade you can get but the real structure is base, advance, principal (P1), P2, P3 and star. If you are a technical person there is nothing more than P3, so you then become a company senior staff which is a different thing. There is a similar management one which goes up to M2, M3, basically. You can keep progressing on the technical ladder and your wages can keep going up because you going up the ladder, but you do not need to be the boss.*

With the parallel approach to career development, people are promoted to very senior levels of the firm through their technical achievements. The promotions are conducted through interviews by a promotion board made up of senior engineers. The people seeking promotion have to demonstrate that they have achieved certain technical capabilities before they can be promoted to the next level in the technical field. The interviewees have to bring along evidence of work they have done and reports they have produced. They also have to present contributions that they have made at a technical level. As mentioned above, the levels of progression up the technical routes range from base, advance, principal (P1), P2, P3, star to fellow. A fellow depicts a specialist in a particular field of specialism. With the technical career route, employees’ wages increase as they move up the career ladder, without necessarily becoming a head of a department.
Process improvement activity is a type of organisational innovation for developing DCs and, according to the Head of Business Management, Rolls Royce endeavours to achieve excellence in its processes:

*We strive to be excellent in all that we do, whether it is finance or quality processes. We try and improve the process continuously through any of the latest techniques every year.*

There is a structured way of improving processes through innovating new processes and process management activities. For example, one of the nine core processes of Rolls Royce, called ‘create customer solutions’, is a process through which the firm creates new products to sell to customers. This process embraces the technology development, so the ability to create new products as well as the actual execution of the creation of new products is all within this particular process. To create and improve processes to develop DCs, senior managers of the firms plan the process improvement activities:

*I think the process improvement activity is partly planned and partly functions the way the business operates (Head of Business Management, Rolls Royce).*

*We have a technology capability right now but in order to keep that technology capability going, we constantly need to be looking ahead to say what do we need in the future and how do we improve our materials or our manufacturing processes? (Chief of APSD Civil and APSD Team, Rolls Royce).*

Managers work closely with process improvement teams to develop new processes, identify limitations, and reinforce their processes, which help to reduce cost and improve efficiency in the firms. A process improvement initiative is a gradual procedure of change to improve processes. It has both formal and informal aspects to how the improvements are conducted. Formally, there are a series of procedures to go through to improve the processes in the firm to the highest level. For example, Rolls Royce goes through a series of ‘process councils’ procedures to improve processes. Commenting on this, the Director Technology and Operations stated that:

*In terms of the formal part of process improvement, what we have is a series of process councils. So to reach the major processes in the firm, there is a process council which has responsibility for owning and improving that particular process.*

Thus, managers in the various departments of the firm have to work closely with the process councils to integrate the new or improved processes into their operations.
Integrating the developed process into the internal operations of the firm is a major task and there is a dedicated team of people who make that happen. Informally, process improvements occur through cultural and attitude change of the employees in the firm. Thus, unlike the formal process improvements, it is not easy to measure the impact of the informal improvements in the firm. The Senior Project Engineer APSD, Rolls Royce, noted this:

So it is not, sort of, you switch on today and switch off physically and actually make a difference. It is meant to be a cultural change and your attitude towards it, hence not an easy thing to measure. In a way, and I think these things are always a focus really, people do change their mindset in some way.

Process improvements always focus on changing the mindset of people towards the way they work. Continuous process improvement occurs if people are looking at the way they do their jobs on a daily basis and try to find better ways of doing them differently and efficiently. This works effectively when people are committed and creative, which brings about changes in the operations of the firm and experience to develop DCs.

To create and improve upon their processes, the two participating firms employ different activities: working with universities, recruitment, working with ex-employees, and acquisition of processes from other firms:

We are always looking at what we can do to make that process better and we will use any of any of these; we will use universities, we will use other parts of the company to bring in old people who used to be experts (Senior Project Engineer APSD, Rolls Royce).

We actually work on four people processes and since I joined in November, this is a new way of working for Sage towards an effective firm and to raise capabilities to our existing platforms (Director of HR, Sage).

The participating firms work with universities to develop new processes and improve old ones. They also bring in new people or ex-employees with experience and skills to change their processes. They acquire the processes and/or benchmarks with other firms on process improvement initiatives. However, the employees learn from this experience on process change initiatives to develop DCs.

There are many different types of innovative processes developed by firms to create DCs. These are create customer solutions, quality processes, learning from others,
modern working practices, gated review processes, knowledge capture processes, financial and resource processes, decision-making, and process excellence. For example, Rolls Royce has carried out about twenty such process initiatives in the last 5 years, and process excellence is the latest one. Rolls Royce's Annual Report 2004 shows that process excellence leads to efficiency:

Our Process Excellence programme continues to drive culture change within the organisation and eliminate waste. We also initiated Functional Excellence in 2006, which focuses on specific areas of activity across the Group with a view to identifying further efficiency improvements and cost savings.

This is about capturing the very simple people processes very clearly so that people do not spend too much time looking at a piece of paper trying to figure out what their processes are.

There is a real benefit with process improvement in creating DCs. Processes are meant to develop and reinforce what people are already doing and serve as a guide to carrying out a project. Although managers are probably already doing all these, it is however important to update the processes they use. Updating and creating new processes bring changes, which engenders learning and assists to develop knowledge and skills in the firm. Process improvements assist to develop people's ability to think, bring about cultural changes in the way things are done in the firm and, as a result, provide the underlying processes to enable the development of DCs in firms.

6.8.1.1.3 Structural innovation

Structural innovation involves the development of innovative systems of working with customers and partners to develop DCs. The aim of structural innovation is to develop effective and efficient ways of providing the best products and services to customers, as well as effective working relationships with suppliers and partners. To develop the ability to innovate structurally, firms develop business models that are creative, flexible and reliable, which support their products and offer good customer support to partners and customers. Some of the managers interviewed noted this:

We offer the customer clearly full support of our existing products. We also offer a number of deals by which we do risk analysis for them, so we guarantee products in the deal (Business Development Manager, Rolls Royce).
For larger businesses to use our products such as line 100, MMS, line 200, etc., they tend not to deal directly with us because those customers are spending a lot of money on planning to get their systems customised and running to how they need them. They often tend to deal with agents called business partners, as they tend to be the people who will go out and pitch business of our products (MMS Manager, Sage).

Most of our new business models now are total care so that after-market services now represent more of our revenue, but of course that comes from a basis of producing the products and then you get the market share which enables you to derive a revenue from the after-market business. So it has been a long-term strategy, which is eventually paying off (Company Specialist, Rolls Royce).

The types of structural innovation developed are financial models and customer care models. The customer care models include total care packages, corporate care packages, service contracts, support contracts, and the reseller’s model. The customer care model is a comprehensive support service designed to ensure that firms always provide the level of service that customers require. This is a long-term agreement and customers usually pay an annual subscription for the support service, which includes telephone support, Internet updates, and maintenance of their products. With the reseller model, managers build relationships with their business partners who sell their products. Through these relationships, the participating firms use the services of their business partners to identify areas of limitations in their products, gain feedback on customer expectations, and gather information on their competitors.

Managers in the two firms have created flexible financial models which vary from offering loan agreements to customers to purchasing their products with associated maintenance or support agreements. According to the Vice-President Corporate Venturing, Rolls Royce, and the Mergers and Acquisitions Manager, Sage, they have been very innovative in this area:

*We have been very innovative in our business by flying power by the hour, which is a trademark of Rolls Royce, so you can rent power we own or a company will rather own the assets and run those. So it is basically a means of satisfying our customer requirements and it has been the process to ensure that we deliver what the customers want (President of Corporate Venturing, Rolls Royce).*

*I think one of the key things is having a financial model that is successful, and that financial model must involve some kind of annual payments from your customers and in that way, as you build the customer base, you continue to have*
continuous sales through that base at all times (Mergers and Acquisitions Manager, Sage).

The financial models differ in the two firms. In Rolls Royce, customers may lease the products and pay for using the product and the maintenance. The payment arrangement is calculated on flying hours of the aircraft. In Sage, the customers buy the products and get a support contract during the agreement period, usually a year, which is renewable. Payment arrangements are based on annual subscription fees. Developing structural innovation is very beneficial to the firms. It offers a medium through which customers can get the best support for the products they purchase. It also assists with the retention of customers, feedback, good reputation, and continuous revenue for the firm.

6.8.1.2 Human resource activities (HRAs)

HRAs have received little attention in extant literature as a means through which DCs are developed (Rindova and Taylor, 2002; Wooten and Crane, 2004). However, in this study, HRAs were identified as important for developing DCs. Intellectual capital is very essential to the development of DCs, therefore developing people capabilities is vital if firms want to improve and sustain competitiveness in the markets within which they operate. To develop and apply technology, processes and resources in an effective way, you need the right people with the right capability, skills and knowledge, who understand what the firms are doing and apply their skills and knowledge to improve on that. Hence, the two participating firms conduct HRAs to strengthen their competitiveness:

In order to continue to grow as a business, we continue to recruit and retain only the best talent. It is our goal to bring out the best in our people and therefore it is our policy to pursue practices that are sensitive to the needs of our people. Our priorities are: ensuring equality of opportunity, fostering diversity and providing a safe workplace, encouraging our people to reach their full potential through training, career development and promotion from within where possible, communicating openly and transparently within the bounds of commercial confidentiality, whilst listening to our people and taking into account their feedback, and recognising and rewarding our people for their contribution and encouraging share ownership at all levels (Chief Executive, Sage - Annual Report 2005).

To strengthen its competitive position, the Group has over many years invested in the training and development of its employees, customers and suppliers. In
2005, we spent £30 million on the education, training and professional development of employees (Rolls Royce, Annual Report 2005).

The rationale for conducting HRAs to develop and renew DCs is: (1) to look for both specialist and generalist skills from within and outside the firm, and (2) to develop, improve and retain the skills and capabilities of people in the firm. There is a structured approach to HRAs for developing DCs; these include procedures through which new people are brought into the firm and how people are developed and retained in the firms (see section 6.8.1.1.2). The procedures stipulate who the firm can recruit and where they can be recruited from, which can be either internally or externally from the job markets. These procedures therefore assist the firms to appoint the right people with the right capabilities, then motivate and retain them to develop intellectual capital in the firm.

The firms also need a strong supportive culture which empowers people, fosters a feeling of belonging, engenders right attitudes, has good organisational structures that foster teamwork, and builds strong senior management support to sustain initiatives. The strong supportive culture is important because it motivates the employees and they stay with the firms, which helps the firms to retain the experience and skills. HRAs involve costs, and hence the firms need money to conduct these activities to develop DCs. For example, the University Liaison Officer, Rolls Royce, stated that:

Recruitment is very expensive, especially for some very specific skills that we need. Sometimes we find it very difficult to get hold of those specific skills and we spend a lot of money advertising, going through the interview process, and sometimes without even finding the right candidate.

The amount and type of HRAs used to create DCs vary. Commenting on this, the Head of Business Management, Rolls Royce, stated that:

I think we have many routes to doing that. We recruit very bright top end of graduates, we like to think we get the crème... We do go to some of the very best graduates and we bring them to the firm. That is always a continual flow. We try and maintain that dream down to the end.

The participating firms frequently conduct a great number of HRAs and the types identified include recruitment, people development activities, and training activities. Recruitment involves bringing new people into the firm. There are various ways through which people are recruited. Some of the managers in the two firms noted this:
We do recruit experienced engineers and that is certainly the case, but we certainly do a lot of recruitment from the graduate population, either through the training programme or direct entry. We will also recruit a number of people with PhDs because again we obviously have a need for highly specialised people in certain technical fields. So we will look externally and recruit certain generic engineering skills from other companies (Head of Business Management, Rolls Royce).

So the process to recruit in itself has got a number of stages to make sure you get the right person (Business Development Manager-Customer Support, Sage).

The firms recruit many graduates and postgraduates, domain experts and a few recognised industry experts. Graduates, postgraduates and domain experts were identified as the main ways through which the firms recruit to create DCs, whilst recruitment of recognised industrial experts was an occasional approach used when the need arises. Graduates and postgraduates are usually recruited from universities and job markets, whilst experts are recruited from competitors, job markets, and through professional journals. The types of people recruited to develop DCs were identified as top end, very bright, intelligent graduates and renowned experts. Graduates and postgraduates are recruited for general and/or specific skills and industrial experts are recruited for only specific skills, such as strong engineering skills, and management skills. The statements from some of the managers interviewed illustrate this:

*When it comes to more senior positions we rely very much on taking people from the OBUs. People who have already spent a lot time in doing something and they will come in that way, basically (Senior Projects Engineer APSD, Rolls Royce).*

*We offer both our internal people and external people roles, so it is a two-way stream. Our external is called first class selection and our internal is called talent spotting. So that when we are going to develop talent counts from top-bottom, bottom-up, we know where our talents are within the business (Director of HR, Sage).*

*I think very often within Rolls Royce, although we do recruit people for specific roles, there are a large number of people who do make very big changes in one area of the business that leads to another area of business (University Liaison Officer, Rolls Royce).*

*So if we are talking about a need for particular specialists, they will be found probably by the engineering director or chief engineer in one of the operating business units. So take for example, we are organised by customer-facing business units, we have airlines, we have marine, defence and energy. The engineering director of say compression or turbine systems might say we need
an extra specialist in turbine materials because we do not have enough expertise. So they will go out and recruit or they will seek to find them from different parts of the company because that is one other thing we do (Head of Business Management, Rolls Royce).

Internally, people are brought into other areas of the firms through movement of people to other departments, job rotation, talent spotting, or a large number of people making changes from one area of the business to another through applying for positions advertised internally. In addition, to find people for particular projects, managers of these departments look across the various departments to find the required specialist internally. As a result of this, people are moved around the different departments and they work on particular projects and either return to their normal jobs after completion or stay in the new department.

The types of graduate and postgraduate recruitments vary. Graduates are recruited through two main routes: the traditional route and the direct entry route. Postgraduates are mostly recruited through sponsored postgraduate programmes. The Employee Development Executive and Head of Capability Owners, Rolls Royce, explained the graduate training programme:

It is a programme that lasts about 18 months, so new graduates will join us in September. It has a structured approach and they do certain basic training to understand fundamentals of manufacturing, design capabilities. It also allows them to go and gain work experience in different parts of the business for typically two or three months to help them build up a knowledge and picture of the company, which is obviously large and complex.

The traditional route is a scheme that is approved by certain professional institutions through which new graduates are recruited into the firm every year. Recruited graduates go through specialised training programmes during which they do basic training, job rotation in the different departments, and finally apply for a position of their interest or are posted to one of the departments.

With the direct route, graduates are brought into the firm directly because there is a particular need for a certain skill. Managers therefore bring in people from outside the industry, job markets, UTPs and universities. Once they are recruited, they enter into a fast track-training or orientation programme to familiarise themselves with the firm. The search for the right type of graduates, postgraduates, industrial experts and domain experts varies:
It depends on the level of the business we are looking at. If we are looking at somebody in the sales role then the requirements for that sort of person are very different from the director of HR or marketing etc. So we use general recruitment techniques for the smaller roles, and for the bigger roles, we use executive search to bring people in and we will check almost the emotional contract in terms of their mentality, their way of thinking, their way of working with the way Sage 'intends to' work and the important word is intends to and not the way Sage 'can' work (Director Product Development, Sage).

General recruitment search is used for general staff positions, and executive search is used for more senior management ones. Graduates and postgraduates are recruited to fill staff level positions, whilst recognised experts and domain experts are recruited for senior positions, specifically specialists.

Recruitment of graduates, postgraduates, renowned industrial experts, and domain experts, as well as movement of people in the firm, assists with the development and renewal of DCs. Some of the managers in the two participating firms commented on this:

_The balance really is maintaining your existing capabilities in your core areas whilst bringing in new people, allowing them to develop, and clearly there are other opportunities with that. Clearly, there are opportunities within the senior managers and, recently, the previous chairman of Rolls Royce was brought in from the oil and gas industry, partly to bring in fresh blood, fresh ways and approaches of doing things (Business Development Manager, Rolls Royce)._ 

_It will be inflexible to have only people who have the depth we need, so we bring in people with breadth to balance it. You also need to know what other companies are doing and to do that we poach people from our competitors (Director HR, Sage)._ 

Recruitment involves hiring people from other industries or departments to augment the existing skills and capabilities. The new people bring in fresh blood, new ideas, and people with breadth, which assist the firms to learn new things from other industries and departments. Learning in this way helps to replenish and refresh the skills of the people and build new skills. It also helps broaden the horizon of the people and to use the knowledge gained from other areas of the firm to influence other products. With the knowledge and experience gained, the firm renews its ability to develop and manage the skills of its people and to enhance its operations. The firms, in order to retain and maximise the skills, experience and knowledge of the people recruited, have to invest in
them to achieve their full potential. The section below explains the activities adopted to sustain the skills and knowledge of people to develop DCs.

One of the activities employed by the firms to achieve this is people development activities, and according to the HR Director, Sage, and the Head of Business Management, Rolls Royce:

> So once we have got them either from the street or internally, we then look at what the development of that person or individual will be, what qualities they have, and to sustain those qualities. What are their development needs and how do we fix that. Is that a training fix or is that a development fix, because they are two different issues, and then do we fix that internally or externally (Director HR, Sage).

> Employee development is proactive and planned and it is about how we can develop not just the sort of leadership future population but how we can take the vast majority of people, and keep developing them and making them better and better and better over time. So that is one of the very high strengths of the firm (Head of Business Management, Rolls Royce).

To develop DCs through people development activities, the participating firms plan and continuously invest heavily in developing and renewing their people skills. The type of people development activities conducted include personal development and career development geared towards all the employees in the firm from top management level to the lowest staff level. Managers have development time which is committed to staff and built into all of their resource plans. Staff in the firm use their development time to develop themselves for a job-related activity. The Employee Development Executive and Head of Capability Skill Owners, Rolls Royce, gave an example of the development opportunities in Rolls Royce:

> I manage a number of specific development opportunities that we make for a few of our engineers where we provide funding each year for a few engineers to either gain experience working at a customer base or enhance their own professional capability by doing a programme of work at an academic institution.

Both firms provide funding for the personal development of their people, but the funding for a particular personal development activity depends on its relevance to the present schedule of the individual’s job. Hence, the higher the relevance of the personal development activity, the higher the funding that is provided. This helps the employees
to develop and improve their skills and expertise in their job functions, which impacts on the development of DCs in the firm.

At a very early stage in their career, people who are potential highfliers in the firms are identified, tracked and developed continuously throughout their career to develop individuals who understand the overall operations of the firm:

*So I think what is important is to know where your talent is and you have a duty of care to find that and then give them the platform on which they can improve themselves (Director of HR, Sage).*

*This is on a continuous basis, for example when we recruit graduates we have a very specific graduate scheme and in a two-year period they move around the firm, they get some specific training and so on and so forth, but then it does not end at that point. We will then look at those people and say whether we think they are people who are going to be future leaders or future specialists and we continue to track them through their career (Director Technology and Operations, Rolls Royce).*

It is important for people who are going to be future leaders to have experience in the different parts of the firm as possible. The firms make substantial efforts to develop the careers of the potential highfliers through internal rotation within departments and functions, and by enrolling them in some form of training. They receive development in different aspects of the firm, thereby acquiring a rounded skill base. These people are designated as potential highfliers because they will either become leaders in the firm or specialists. As a result of this, the firm develops a breadth of skills and experience, which is more than if people just grew organically in the narrow piece of one area of the firm.

In addition, the people in the firm are developed and given a career path through succession planning and internal promotions, either within the same department or in different parts of the firm:

*The succession planning is a major part of what I do when supporting the different parts of the business and I support the company skill owners as well. So there is quite a lot of career counselling involved (Company Employee Executive and Head of Capability Skill Owners, Rolls Royce).*

*Development is giving them a career path and a progression which allows you to grow those capabilities and then grow those people to a point where they can be called experts in their field (Manager Technical Support, Sage).*
We promote a lot internally, I have just appointed somebody from the sales environment and they have a lot of sales management skills (Business Development Manager, Sage).

Succession planning is carried out either through the traditional management route of a single progression or through a parallel route of both management and technical routes, and members of the firm decide which of the routes they will follow. With the parallel approach to career development, staff can progress in their career based on the work they have done and capabilities they have, and not necessarily waiting for an internal vacancy to appear before progressing. The levels of progression differ (see section 6.8.1.1.2).

The career development activity, especially the parallel approach to career progression, is a good policy that aids the development of capabilities in the firm. The career development activities motivate firm members to perform very well and develop the necessary capabilities to progress in their career paths. It is very motivating, because people know what they are aiming for and there are very clear criteria of how to progress on the career ladder. The continuous use of people development activities enhances the skills and capabilities of people in firms. This helps improve the processes, and bring about innovative ideas and efficient ways in the operations of the business, which leads to the development and renewal of DCs and the ability of the firm to carry out people management activities effectively.

Training is another HR activity for developing DCs. Training is part of the development process of people in the firm, and hence it is a planned and proactive activity, which is done through the training department with inputs from other departments. The participating firms have different types of training programmes:

So that is developing people to be the best. So we have got some internal programmes, i.e. leadership programmes and management programmes. We have got some entrance/induction programmes for everyone. We do have programmes to suit the business stream and are tailored to the business streams but we also have external injection help (Director HR, Sage).

Well, I think the very obvious one that I can probably speak about is that we have very large training courses that we can go on within Rolls Royce. Again, the culture on training is very good and going on a training course is not a big problem for me to get, even though it means time out of the office and obviously time to complete the course. But if the course is relevant, then it means I can go
on that course and I try to pick up skills from my colleagues (University Liaison Officer, Rolls Royce).

To develop DCs, managers conduct many training programmes. The rationale for training employees is to develop their skills and capabilities. In the two firms, the training department organises training programmes for employees based on inputs from their managers or capability skill owners. The type of training includes internal and external training programmes. The former consist of induction programmes, process-based learning, management programmes, leadership training, Internet-based training, tool box, health and safety, on the job training, technical learning, graduate training programmes, and big demonstration programmes. The external programmes include management courses for potential highfliers and developmental training programmes.

These training programmes must be available and also relevant to the operations of the business. People in the firm have to be trained for both current and future roles on a continuous basis, as noted in the 2005 Annual Report of Rolls Royce:

*Training programmes were delivered to support major change programmes. In particular, we have launched the ‘Process Excellence’ initiative to improve our management and operating processes and we have trained people to undertake specific projects to raise standards of performance and improve customer satisfaction.*

The duration of these training programmes may vary from a few days to two and a half years or more. The training programmes vary from formal to informal. Formal training is the classroom-based programmes and informal training is the support from experienced staff and on-the-job training. The latter involves secondment and job rotation through the different departments of the firms. Through training, the firm builds and enhances its people capability, skills and experiences. The firm gains experience from the efficient and effective training, which in turn leads to development and renewal of the ability to manage employees' development and training activities in the firm. Thus, with the continuous training, managers develop and improve their people capabilities, skills and knowledge within the firm.

The outcomes of HRAs lead to the development of DCs in firms because new recruits bring in new ideas, knowledge, expertise, different types of skills, and new processes. As a result of this, the firm learns new practices and processes, and develops new skills and work practices, which helps to renew the skills of people in the firm and develop
new ways of doing things. People development and training activities in the firm also help people to understand the changes in the market and prepare them with the right skills and knowledge to meet these future changes. The knowledge, skills and experience gained are accumulated and utilised, which leads to performance. Through the continuous and efficient application of these HRAs, the firm develops skills, knowledge, experience and expertise which lead to the development or renewal of the ability to manage its people, market orientation, innovation, and the flexibility to adapt to changes in the dynamic environment.

6.8.1.3 Summary of internal activities for developing DCs

In conclusion, internal development is one of the main approaches to developing DCs. It has to be planned, structured, and a continuous process. The amount, intensity and focus of the internal approach vary. There are certain steps that are taken, which involve strategic decision-making and the ability to invest in areas that are lacking. There are also factors required to develop the DCs: the availability of resources required, cost involved, the merits and demerits which have to be taken into consideration when using this approach. The types of activities include in-house innovation and human resource. In-house innovation includes business scope, organisational and structural innovation to develop abilities in new product development, and improved and new processes. HRAs involve recruitment, people development activities, and training. These activities are used to develop and renew people skills, expertise and experience. As a consequence of these internal activities, the firms develop DCs of innovativeness, ability to manage HR and knowledge, and market orientation to adapt to the dynamic environment within which they operate.

6.8.2 Activities: External Developments

The two firms adopt external development of DCs when they cannot develop all the DCs required for the successful operations of their business strategy in-house. The firms therefore look externally for alternative ways to acquire the remaining skills and capabilities. Some of the managers interviewed confirmed this:

*I guess if there are other technologies that we want to bring in quickly, then obviously we might bring in known external resource with capabilities in the areas in which we are deficient (Senior Electrical Engineer, Rolls Royce).*
For example, if we notice that there is a shift towards using the Internet, and more businesses want to employ that, but we find that it does not belong to our accounting software, then we will acquire a company with that knowledge and skills (R&D Manager, Sage).

So we need a really good external network in areas such as engineering knowledge, and manufacturing (Head of Research and Technology, Rolls Royce).

The types of external developmental activities to develop DCs are collaboration and acquisitions. The two firms collaborate with different stakeholders in their businesses and acquire other firms for R&D knowledge, research, and manufacturing skills to develop and renew DCs. The rationale for adopting an external development approach to develop DCs is (1) to understand the markets within which firms operate, (2) to provide knowledge of future innovation, (3) to provide knowledge of position relative to competitors, (4) to acquire certain specific capabilities and skills, and (5) to grow the business. There is a structured approach for developing DCs externally, which involve certain procedures that have to be followed when making acquisitions or collaborating with other firms.

It was identified that the participating firms use the two types of external developments differently. This was made evident by the extent of collaboration that Rolls Royce has: 14 joint ventures (JVs), 20 UTPs, and a number of research consortia, but acquires occasionally. Sage, in contrast, acquires more than collaborates with other firms to develop DCs externally. From 1991 to 2006, Sage made 29 acquisitions (see Appendix E). Thus, the activities for developing DCs externally vary from a few to many collaborations and acquisitions, which are conducted frequently or occasionally. The section below explains the various types of collaboration and acquisition activities conducted to develop DCs.

6.8.2.1 Collaboration

Firms collaborate with some of their stakeholders to collect information, understand their markets, and use the skills, capabilities and processes of the collaborating firms. The types of collaboration used are equity and non-equity, and the types of stakeholders that firms collaborate with are manufacturers, suppliers, customers, partners, other firms, and professional bodies. The amount and types of collaboration to develop DCs vary: alliances; research partnership with competitors, universities and partners; and
networking which varies from direct to third-party networking. The types of collaboration are expounded in this study through the identification of the forms of collaboration that enable the creation and renewal of DCs, and each identified is now discussed in turn.

DCs are developed through the formation of alliances. Successful alliances operate on certain procedures that have to be followed to develop and renew DCs. In the data analysed, the following were identified: (1) set up clear objectives at the outset, define and document the elements provided by each party and the benefits that accrue to each from successful collaboration, (2) identify how the collaboration will be most beneficial for the business and identify the structure and operating issues that need to be addressed to achieve results, (3) protect the firms' intellectual property rights through legal agreements and restrictions when transferring proprietary information, (4) define how you will operate, (5) the cultures in the firms must be compatible, (6) be honest with each other, spanning clarity in all dealings, and parties operating with an acceptable level of trust.

The type of alliance identified was the formation of many joint ventures (JVs), and as stated by the Head of Business Management, Rolls Royce:

*The main way through which we develop our capabilities externally is through partnership in the form of joint-ventureship.*

From the data, there are many reasons for forming JVs, such as to obtain certain skills, contracts and requirements, to control suppliers, to enable entry into markets, and to increase and improve capabilities. It is important to note that not all JVs are for increasing and improving capabilities. There are some set up specifically for marketing or manufacturing purposes, and so numerous sub-companies are set up as JVs to market or to manufacture a particular product. It can be done for all sorts of reasons, from tax rebates to certain complementary technology reasons. In this study, however, the focus was on JVs for developing DCs and these are formed to gain a crucial piece of technology, intellectual capital, bring together specific skills, resources, and acquire capabilities in such ways that may complement each other. The comments from some of the managers illustrate this:
JV is something that you do when you have to do it, it is not that we go out and seek JVs as a way of doing business. We use JVs when they are a useful way of expanding our capability (Director Technology and Operations, Rolls Royce).

Rolls Royce has done a lot of partnering in JV forming; about 40% of our engines are manufactured through partnerships with key manufacturers around the world. So we do more partnering, much more than acquiring (Vice-President Marketing, Rolls Royce).

Rolls Royce has many JVs and about 40% of their engines are manufactured through partnerships. Using JVs to develop DCs depends on certain factors. For example, Rolls Royce has a set of procedures which have to be followed for setting up JVs to be successful, and according to the Director Technology and Operations, Rolls Royce:

The two parties in a JV have to be very open, have to be very honest with each other, and have to be clear about what their objectives are. Providing you do that, I will say it can be a very successful way of avoiding the very high cost of bringing yourself to the level of capability you need.

These procedures include the type of JVs, the objectives, equity, benefits, and also clauses that apply for the break-up of the JVs, as mentioned above. Although dealing with each JV is unique, this set of procedures applies as a basis for the formation of the JVs. JVs are set up for specific projects, hence the natural life span of a JV is 2-5 years and 8-9 years, depending on how successful it is. JVs can be both successful and unsuccessful. The firm learns from the successful JVs in order to develop superior ability when dealing with the next one. A statement from the Head of Business Management, Roll Royce, confirms this:

I think some of them have been successful and some of them have not. You learn lessons from the ones that are not successful, and the ones that have not been successful are the ones that have not had clarity between the two parties.

To use JVs successfully to develop DCs, they have to be managed. Although JVs give firms immediate access to skills, knowledge and technology, managing JVs can be a daunting task. The ability to manage JVs is developed and renewed through the continuous management of different types of JVs in the firm. There is a dedicated team that oversees the formation and monitoring of the various JVs that are formed. The JVs’ management team ensures that procedures for the formation of JVs are followed and also that the two parties are wholly aligned, given their aims and objectives for the JV. Through the continuous use of JVs, the firm improves their capabilities, and develops
significant control over its cost base and dealings with supply firms. These benefits were made evident by some of the managers interviewed:

Yes, we improve the capabilities by working within the context of the JVs. It gives us the ability to invest in a way that we have control over the intellectual property, we have control over the cost, we have control over the quality, and it is really a control issue from the Rolls Royce point of view (Director Technology and Operations).

So within the supply chain, we use their skills and also if we need to develop something new, we might say 'Here is a function we want you to provide, so you must do this,' and so we use the supply companies' expertise (Head of Business Management, Rolls Royce).

So the logic is that we both gain. If they gain from the captive customer base in Rolls Royce, we gain because we have significant control of the cost base associated with the coatings that we to put on our engines. So we have predictability now in terms of what that is going to cost over time, because we are obviously sharing in the development of that capability (Director Technology and Operations, Rolls Royce).

Working with supply firms gives the firm the opportunity to inform suppliers or partners of customers' needs, the use of the suppliers' skills and expertise, control over their intellectual property, and control over quality issues. JVs bring in additional skills and knowledge to the firm, which they would not have readily or could not develop at all. The continuous use of JVs, the successes and failures, lead to the development and renewal of DCs.

Another type of collaboration for developing and renewing DCs is research partnership with other firms. The rationale for the formation of research partnerships is to carry out research, develop technology, and acquire skills. Research partnerships and JVs differ. Unlike JVs which involve setting up a new business or sub-company for a specific reason and within a certain time frame, research partnerships are very long-term relationships with other firms, suppliers and universities for a mutual benefit, without setting up new or sub-companies. The research partnerships are not just about specifying what the firm wants, but rather the partners being innovative in identifying areas that will be beneficial to both in the long-term. It is also important to build and maintain a close relationship and dialogue with partners.
A type of research partnership for developing DCs is the University Technology Partnership (UTPs). The UTP model is not a contract form of research, but is a partnership. This partnering with universities is done in order to carry out research and technology development. The universities within which the research is conducted are referred to as University Technology Centres (UTCs). The following statements from the interviews support the point on the UTPs:

Again, perhaps one of the unique features of Rolls Royce in this context is the way we work with universities and do a lot of our research in long-term partnerships with universities, and it is called the university technology centres model. That was something that Rolls Royce started twelve years ago and it seems to be seen by many as good practice in the R&D. GE, our biggest competitor, have only said they are trying to copy that model (Company Specialist, Rolls Royce).

We have a big university network. There are a number of key universities, many in the UK and worldwide, where we now have strategic relationship with them (Head of Strategic Research Centre, Rolls Royce).

I know in the context of 10 or 15 years we set up UTCs and they are known as UTPs. The UTPs are in universities where we provide funding to the universities and maintain a level of throughput of PhD students and research going on in those universities. The UTPs are on a specific specialism, for example it may be specialism in say combustion for one university or it might be materials for the other university or electrical control systems for another university. We take the best universities we can with each specialism (Head of Business Management, Rolls Royce).

So we have formed a lot of committees and university technology centres. So, for example in Cambridge, we have aerodynamics special links with them, and at Sheffield we have metallurgy. So we have a group of universities, mainly in the UK but there are some overseas universities, where we have specific academic links and we fund research there (Vice-President Marketing, Rolls Royce).

We have about twenty university technology centres at the moment, which are not only based in the UK but abroad as well (University Liaison Officer, Rolls Royce).

Rolls Royce provides funding to the universities to maintain a level of throughput of PhD students and continuous research. The nature of the UTPs reveals that most of the PhD students do sponsored work on specific firm problems, and they develop new technology and techniques from the academic side into the real world practical side of the firm. In addition, the universities also look for other funding such as ESPRC, national government, and EU funding for research work on technology in these
universities. The UTPs are set up for specific work packages with specific universities. The best universities with specific specialism are chosen for each specific package. For example, 10-15 years ago, Rolls Royce set up twenty UTPs, with locations mainly in the UK and some in America and Europe. Some of the specialities they have with the universities are efficiency in engines, performance in engines, electrical control systems, developing materials, combustion, and specific academic links. The UTPs lead to a very close and beneficial working relationship between the firm and the university. The university gains by having students working on projects continuously, and the firm benefits from having an excellent university to carry out their R&D.

Management of the UTPs is a very important part of developing and renewing DCs. In the universities, each UTC has a director, a senior person in the university, and in the firm, all the UTPs have a senior sponsor or a skill owner who manages the partnership. However, regarding the interface between the firm and the university, there are UTP coordinators who act between the academic side and the firm. A statement from the Company Specialist, Rolls Royce, illustrates this:

So we have a senior sponsor but in terms of the interface we have what we call UTC coordinators who act as interface with the UTPs. Depending on the nature of the UTC, we could have more than one coordinator on a particular UTC. The UTC coordinators are critical individuals for the UTCs because they have to know who could have that main technology, who the main customers are in the business, and have to maintain a relationship with those interested to buy the engines.

Depending on the type and nature of programmes, the firm could have more than one coordinator in a particular UTC. The UTC coordinators play a critical role in the partnership. They operate on two different planes, the academic side and the industry side. They thus have to know who could have the main technology or skill they require, who the main customers are, and also maintain a relationship with them. A critical aspect of managing the UTPs is how the knowledge created in a particular UTC is transferred into the firm and utilised efficiently to bring about change. As noted by the Company Specialist, Rolls Royce:

Knowledge process, where we have to bring that knowledge into the company and make sure we put it to use, is an important process and it is easy to get that wrong. It is easy to get that wrong because you are spanning two very different worlds for a start; the personal interface is quite important, here you have the
academic world, and the industrial world, they have quite different drivers and to be an interface you have to be really credible in both worlds.

The firm conducts a lot of internal marketing to introduce the knowledge developed in the UTCs into the firm. During the transfer, the UTC coordinators must be able to present the people working on projects with the knowledge that will meet their needs. Further, they have to demonstrate how the new knowledge meets the needs of these people because they would not risk changing if it does not, so it is important to understand what the internal customers need. Since UTPs are long-term relationships with universities, the UTC coordinators have to ensure that the firm builds very good relationship and maintains dialogue with the universities and internal customers to set up new projects in a collaborative way. As noted by the Head of Business Management, and the Senior Electrical Engineer, Rolls Royce, maintaining a close working relationship with universities is very beneficial to the firm:

That is obviously a very close and very beneficial working relationship that means the university gains through having a tied customer and we have an excellent university, which knows it is working at the front end (Head of Business Management, Rolls Royce).

Working with universities does come into it very substantially, making best use of UTPs that we have, identifying opportunities perhaps for use of UTPs and perhaps make way for understanding where we don't any longer require certain technology or technology development (Senior Electrical Engineer, Rolls Royce).

The firm develops very close beneficial relationships with universities which assist to develop new technologies, skills and the opportunity to conduct research with the best universities in specialist areas. The firm has access to research that it develops and that developed by the universities, which enhances its ability to innovate. The universities also benefit through continuous collaboration with a company to conduct research. The successful transfer of usable knowledge through long-term close relationships between the internal and the academic sides assist to develop expertise in the firm and the management of the UTPs. This improves the ability of the firm to manage UTPs, conduct research, be innovative, and develop technologies with an opportunity to understand technology better. The efficient and effective transfer and utilisation of knowledge from the UTCs in the firm leads to the development and renewal of DCs.
DCs are developed in the firms through the formation of a research consortium and development network. This focuses on both big developmental research programmes and technological developments. For example, Rolls Royce has links with a number of European research projects with partners, such as NACRE (New Aircraft Concepts Research), ADVACT (Development of Advanced Actuation Concepts to provide a step Change in Technology to be used in the future of Aero-engine Control Systems), VITAL (Environmentally Friendly Aero-Engines), ANTLE (Affordable Near Term Low Emissions), which vary from £25 million to £100 million. Also, Sage has links with developmental networks such as Microsoft development networks to monitor and gather information on impending developments in their markets. This information is then used by the firm to plan for future product and service innovation. The Senior Project Engineer APSD, Rolls Royce, and MMS Manager, Sage, gave examples of these:

"So it is very interesting we are involved in a lot of research consortia and those are huge programmes. There is one called VITAL which is all about designing fans we were talking about earlier: how do you design the next fan? That is a 100million Euros programme, others such as NEWEC is about 30m, NACRE is about 35m ROSAS is about 25m, these are absolutely huge European programmes, you know they are real huge, big money stuff (Senior Project Engineer APSD, Rolls Royce)."

"So what we look at is that if you take on the technology side, our team are part of things like Microsoft development network which allows them to check on latest developments or what impending developments are within the new technological areas. We will also have our domain experts hooked into all of the appropriate committees that are likely to affect our businesses situations like taxes, accounting, that sort of thing. So we try to be involved upfront and then roll that knowledge into the company, and then disseminate it to the team (MMS Manager, Sage)."

For example, in Rolls Royce, the investment it makes towards this research and development varies from very small to big investments, depending on the type of research. This partnership could have a direct or indirect impact on the operations of the firm. It is direct when the research involves the core product of the firm or indirect when the research is on general technology, but could have areas where the firm could benefit. According to the University Liaison Officer and the Senior Project Engineer APSD, Rolls Royce:
Developmental programmes are a big part of what we do and I think it is inevitable that we make a heavy investment in development with high technology companies (University Liaison Officer, Rolls Royce).

So we have got all of these huge research programmes going on, some directly by this department and some by other departments. That is how we get knowledge into the department of what could potentially happen and that happens throughout Rolls Royce (Senior Project Engineer APSD, Rolls Royce).

This research collaboration has significant benefits for developing DCs. Although firms make a small amount of the required investment, they gain a great deal because they have access to all the ongoing research and development. Though it might not exactly be what the firms want, it gives them the opportunity to understand the new developments and to gain knowledge to plan for future developments. Again, investing alone in internal R&D means that the firms have to make big investments. However, with the research partnership, they only make small investments together with others, which reduce the cost of investing in R&D alone. It also gives them the opportunity to see all the research work being carried out which they could adopt to improve their DCs.

Networking is another collaborative activity for developing DCs externally. External networking ranges from formal to informal and direct to third party. The Company Employee Executive and Head of Capability Owners, Rolls Royce, stated that it is important to network with its stakeholders to understand the competitive environment:

So it is absolutely critical that we have a close relationship and we obviously try to understand in a competitive sense what our competitors are doing.

Direct networking enables the firms to maintain close relationships with customers, suppliers and partners. With direct networking, these firms employ different long-term schemes, such as service contracts, financial contracts, total care packages, social events, research, and direct interactions with customers and partners to get them to understand their products and services as well as gather information on them. To the firms, maintaining close relationship with stakeholders is very critical to the survival of their businesses:

We have a very strong relationship with our customers and we put customer service very high on our agenda. It is something that we measure and try to improve more on a constant basis (Product Manager, Sage).
It is about getting close to your customers, so airline people will talk to our people in civil airlines. So pretty much most of the airlines around the world are our customers in some form and as a result of that we need to maintain a close relationship to understand what they require, but also to make sure that they understand what the availability is of our latest services, new technologies and new systems (Vice-President Corporate Venturing, Rolls Royce).

Since customers are critical to the survival of their businesses, the firms invest to develop new business models to enhance the products and services they provide for their customers. The business development managers in Sage explained how they achieve this:

So we invest a lot of money and time in finding out exactly what our customers want so that we deliver exactly what they want, rather than what we think they want. So we spend a lot of resource time and money on the research side (Business Development Manager - Marketing, Sage).

We often give business partners football tickets to St. James Park and a couple of key people now often get invited to go to there. But I often have to go just to talk to business partners to get information on how things are going and how they are doing, in a more relaxed environment. In such an environment, they are ready to tell you their grief and their discontentment than in an office environment (Business Development Manager-Technical Support, Sage).

The firms therefore invest a lot of money and time in research to determine the type of products and services their customers would like. The research is conducted through direct interactions with customers, either through telephone interviews or panel discussions on products and services:

All of our operating companies focus on customer satisfaction by monitoring customer advocacy and recommendation; undertaking loyalty surveys; responding to customer support phone calls, handling on average 30,000 calls per day in total; holding customer awareness events and discussion groups to enable customers and Sage employees to meet face to face; surveying SMEs to understand their business issues; releasing publications discussing current business issues. The success of our customer satisfaction policies is evidenced by the numerous industry awards won by our operating companies (Sage, Annual Report 2005).

They gather information from their customers and business partners through social events and due to the relaxed atmosphere of these, their customers and business partners share their problems with managers better than in an office. As a result of the continuous direct networking, firms gain both positive and negative feedback on areas
of their products and services, and information on the products and services customers would like to see. The information gained enables the firms to add real value to their products and services.

The firms generate business intelligence to assess their competitive position relative to their competitors’, especially their strategic competitors. This is critical for developing the necessary DCs, to sustain competitiveness in the future. The Senior Electrical Engineer, Rolls Royce, in explaining this noted that:

There is also the need, to know what the competitors are doing to ensure you have got competitors market in the future. So knowledge of what our competitors are doing is important. There are a lot of ways in which that is done, we need to monitor for example GE and how competitive we are to them, and hence this gives us some insights into the technology that they are developing.

Through direct networking with competitors, the firms identify new technological developments and assess how this could impact on businesses in the future. They also assess their status in relation to the new technological developments and conduct a review to determine whether they are ahead of the new technology or they are lagging behind, whether they have to develop the same sort of technology or they are confident that technologies they might already have or are in the process of developing are going to be adequate in the future. From this assessment, the firms take appropriate measures to ensure that they are on track with the new technological developments. Through continuous intelligence gathering and having a flexible approach to changes in their operating environment, the firms develop the ability to generate business intelligence. With this, the firms have a wealth of knowledge from their market and are able to develop the necessary capabilities required. This therefore gives the firms the ability to react quickly to new developments in their internal and operating environment. The Product Manager, Sage, notes this:

We are able to move quite quickly, people can react quickly in the business to a changing business environment. I think one of our key capabilities is definitely to react quickly to things and take advantage of some opportunity cost. You know we can react to things, so we can get that opportunity cost as well.

In addition to direct networking, the firms use third party networking to develop DCs. This involves gathering intelligence from the wider world through attending UK and
international conferences where managers interact with competitors, partners and customers to gain knowledge of current issues in their business. For example, in Rolls Royce, staff frequently attend conferences to network with business partners and customers:

*We frequently go to conferences. I say 'frequently' because we are expected to go to two or three conferences a year, where there is emphasis on specialists' conference in the UK and an international conference (University Liaison Officer, Rolls Royce).*

*We go to a few we feel we can get away with, and they fall into two categories. Technical, and they are more like the traditional technical conference designs, really very, very technical papers and that's part of looking into the future technology in aviation. The other half is business conferences and there are thousands of those to do with low carriers. So there is ample opportunity for working external network through that sequence of people (Vice-President Marketing, Rolls Royce).*

The conferences for networking can range from very technical conferences involving technology and designs issues, specialist conferences on specific areas of technology, to business conferences that focus on the management of products and services. The reasons for attending such conferences are to keep up with the latest technologies and management developments in the industry.

Networking is beneficial for developing and renewing DCs. The Business Development Manager, Rolls Royce, and the Director of Investor Relations, Sage, note this:

*I think probably the biggest thing is an understanding of what it is that makes your products and by products I also mean services and value. Understanding of your products comes with things like being closer to the customer and to your market to be able to react and predict change. That is one of the important things, and certainly a vision of where you will be (Business Development Manager, Rolls Royce).*

*And what that relationship does is that it means the customers tell us all sorts of things about what they need, what is going on with the given software, and what they will like in the next version of the software, that is crucial (Director of Investor Relations, Sage).*

Networking gives the firms access to good intelligence and knowledge of their customers and competitors, which enhances their ability to understand and predict the markets in which they operate. By getting closer to customers, the firms receive feedback on their products and services. The feedback is then built into developing new
products and adding value to services to satisfy their customers. The firms are able to keep up with competitors because they continuously seek information on what is going on in their operating environment and with strategic competitors. With continuous networking, the firms develop the ability to deal effectively with customers and keep a constant eye on the market. They learn from these experiences and are able to build and/or renew their DCs in a continuous manner to adapt to changes in their operating environment.

Overall, collaboration brings in additional skills and knowledge to the firms, which they would not readily have or could not develop at all. Through continuous use of collaboration, firms develop significant control over their cost base, the opportunity to inform suppliers and/or partners of their customers’ needs, the use of suppliers’ skills and expertise, good control over their intellectual property, and understanding of quality issues. It affords the firms the opportunity to conduct research and development of technologies, and to have access to good intelligence on their customers and competitors, which is built into developing new products and services. This enables the firms to develop DCs in market orientation, innovativeness, and ability to manage collaboration.

6.8.2.2 Acquisitions

The other route through which DCs are developed and renewed externally is through acquiring firms, and hence their capabilities (Henderson and Cockburn, 1994; Eisenhardt and Martin, 2000). The degrees to which acquisitions are carried out vary from occasional to frequent. For example, Sage frequently acquires other firms as the main external source of developing and renewing DCs. In the last 16 years, Sage has made 29 acquisitions:

We also seek to innovate and grow through a carefully managed and disciplined acquisition strategy, supporting our existing businesses. We acquire companies in order to bring new products or knowledge to our portfolio, which has strengthened Sage and has brought greater depth and expertise (Sage, Annual Report 2006).

We bought a lot of companies which already have a functional customer base and products in lower end software. We have acquired companies since I joined the company and well before I joined. Since I joined the company, for seven
In contrast, Rolls Royce made about 5 major acquisitions in the last 15 years, as noted by the Director Technology and Operations, Rolls Royce:

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\text{Not a lot. In the past 15 years we have probably done four or five major acquisitions, no more, and they have been done very strategically in order to address some parts of the business where we had some weaknesses or we needed to expand into a particular market or we needed access into a particular market (Director Technology and Operations, Rolls Royce).}
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The reasons for carrying out acquisitions in firms are very strategic in nature and were identified as efforts to address some weaknesses in some parts of the business, expansion into a particular market, gaining access to capabilities, and to create new strategic options. It must be emphasised that acquisitions is a way of obtaining capabilities but it is not the only benefit that may accrue from an acquisition. The firms may acquire new customers, new manufacturing capabilities, new commercial acumen, and access to new markets. The main focus of acquisition to develop DCs is on proven technology and skills. From the findings, effective acquisitions are those that are complementary to the business and targeted for specific reasons, and not in competition with existing capabilities. The following excerpts from the data confirm this point:

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\text{We seek acquisitions which enhance our range of products and services and which support our strategy of meeting the broader needs of SMEs (Sage, Annual Report 2006).}
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\text{I think the first thing you have to be careful about is the acquisition that you are making. So clearly, the acquisition has to be complementary in some way to the businesses that you already have. So we are not in the business for just the sake of doing acquisitions, we do acquisitions targeted for very specific reasons, we look at our overall business portfolio and we can see where the gaps are that those acquisitions can fill (Director Operations and Technology, Rolls Royce).}
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\text{The difference probably is the difference in the investment on the balance sheet and investment on profit and loss. So revenue investment always seems to be quite expensive for us, whereas because we have strong cash balances and so on, if we can invest through acquisition, then that seems quite a good thing (Mergers and Acquisitions Manager, Sage).}
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Acquisitions for developing and renewing DCs could either be horizontal, where the acquisition is in the same industry, or vertical, where the acquisition is in a different industry. For example, in 1995, Rolls Royce acquired the Allison Engine Corporation in
the US (Indianapolis) in the aerospace market. This was a horizontal acquisition and they were able to share and transfer some of the necessary skills and best practices across these two firms. Vertically, Rolls Royce acquired firms that are in non-aerospace markets, specifically the acquisition of part of Vickers a few years ago. Through this acquisition, Rolls Royce gained a lot of marine technology and people with skills and expertise in marine technology. As a result of this, Rolls Royce was able to transfer gas turbine materials into marine applications, and now Rolls Royce holds a number one position in the marine sector.

It is important to note that every acquisition is treated as a unique case. Although acquisitions are handled on a case by case basis, in the two firms successful acquisitions depend on the following mergers and acquisitions set of procedures: (1) ability to select appropriate acquisitions, (2) ability to appraise the financial returns available from the acquisition and, on that basis, the price that should be paid, and (3) ability to integrate the acquired firm into the operations of the acquiring firm. A mergers and acquisitions team manages the acquisition process through selection to integration, and they are reviewed by a central team to ensure that they are adding value to the acquisitions. Selection of the appropriate acquisitions could be made from local business units to corporate businesses. In the words of two of the managers in Sage:

Our local businesses are active in the ability to select appropriate acquisitions and the centre (Sage Group) has the ability to appraise the financial returns available from the acquisition (Director of Investor Relations, Sage).

And then we are reviewed by the central team, the group team who will track the numbers to see if we are adding value or not. So the crucial thing for Sage is that we have people who have done it before, experienced people, we have the cash resources to make acquisitions, we have the exchanges of best practices, that sort of thing, that is all great, but to actually continue improving and refining the processes is the key thing, otherwise our competitive advantage we have will be nil (Mergers and Acquisitions Manager, Sage).

The selection and acquisition of a firm depends on resources such as financial, supportive culture, and people, as noted in the 2006 Annual Report of Sage: We manage our acquisition programme through rigorous analysis of the strategic opportunity, cultural fit with our corporate vision and strong financial discipline. There is a cost implication when making acquisitions and the acquiring firms needs money to be able to buy a firm. To ensure the integration of an acquired firm, transfer of knowledge and
skills, and the sharing of best practices, the acquiring firms need supportive culture. They also need the right kind of people in the business to lead the change, a team to manage a particular acquisition, and technical people to assist with the integration process to make the acquisition successful.

The most important aspect of the acquisitions made to develop DCs is the integration and the utilisation of acquired firm's capabilities. Integration could take two main forms:

There are two approaches, we can either completely integrate them into the business or we can operate them at arm’s length as a small team by themselves. So it is not always a case of you are just bringing them into the company; we might acquire them and let them get on with things in the background without disrupting the way they work too much (Mergers and Acquisitions Manager, Sage).

For example, Alison, which is now called Rolls Royce Corporation in the US, once a single company, was fully integrated and has been broken down into different business entities which form part of a larger business entity within Rolls Royce. So, for example within what is now Rolls Royce Company, we have defence business which is integrated with the rest of the defence business across the whole company ....So there is a stream of activities within what used to be Alison Corporation which is now integrated with the rest of the Rolls Royce Company (Director Technology and Operation, Rolls Royce).

Firstly, there could be a complete integration within the present team of the acquired firm by bringing them physically into the firm’s building. It also involves the integration of the products and services, procedures, work practices, culture, and clients of both the acquired and acquiring firm. This can be immediate or a gradual process of integrating the people into the culture of the acquiring firm. The second form is partial integration. This involves keeping the acquired firm independent to operate from its old location because bringing it into the corporate office can destroy the capabilities acquired. In this instance, the acquired firm keeps all the good people but leaves them alone to flourish. Integration therefore occurs through some cross-fertilisation and transferring some great ideas in a non-intrusive manner through best practice sharing. However, there is a core group that oversees the operations of the partially independent acquired firms. The adoption of a complete integration or partial integration depends on the quality and size of the acquired firm, type of acquisition, the technology acquired, and the intensity of the need for the particular technology and skills.
Acquisitions can also be successful and unsuccessful. To be successful, the first thing is to try and make sure that the people you acquire as part of that capability are staying, and the way to do that is to practically demonstrate to them that there are opportunities with the acquisition. The second success factor is adding value to the acquisition and not destroying the capability that was acquired in the first place. The Director Technology and Operations, Rolls Royce, emphasised this:

*For example, when we acquired Vickers one of the bases for the acquisition was that we wanted to make sure that we had a route to market for our gas turbine, because the production at that time showed that there will be great market opportunities in cruise liners and space ships, etc. But in doing that, the last thing we wanted was to destroy their existing businesses because they have given us the market's directions.*

A substantive way to look at acquisition is to take the acquisition and add value rather than just taking things immediately from the acquisition. The firms add value to acquisitions through the use of their brand names for products of the acquired firm, sharing their best practices with them, giving the acquired firm a customer base, and taking on the intrinsic value (skills and capabilities) from the acquired firm. So, the success factors of acquisitions to develop DCs involve adding value, gradual process of integration, taking the intrinsic value of the acquisition, and not trying to cut down cost by hurriedly bringing the acquisition into the acquired firm. When this happens, then the acquiring firm would benefit from the acquired firm’s capabilities, skills, techniques and markets. For example, Sage adds value to new acquisitions by bringing operational excellence to their local initiatives and helping them to introduce models to manage their customer service and support related activities more effectively. The Mergers and Acquisitions Manager and the Chief Executive, Sage, noted this:

*We try to add value to the acquisition by giving it some 'sweeties' from our 'sweetie jar', if you like. Whereas a lot of the acquisitions that tend to hit the headlines and appear to be failing are the ones where they try to put two things together and try to strip down costs, and really realise that by that attitude. So I think that is actually true, we are always trying to add to the acquisition rather than take away from it. Although we will soon realise the synergies, that is always part of the plan, but it is not top of our list (Mergers and Acquisitions Manager, Sage).*

*We add value to new acquisitions by bringing operational excellence to their local initiatives and helping them to introduce models to manage their customer service and support related activities more effectively (Chief Executive, Sage, Annual Report 2004).*
Experience of acquisition plays an important role in the integration process. To integrate acquired firms successfully, there is a need to retain the existing people, keep the existing structures, and undertake a gradual change-over to rationalise the capabilities, structures and skills that have been acquired. Some of the managers explained the integration procedure in their firms:

*It tends to be done on quite an informal basis. So if you have two people from the various units of Sage and the acquired company who are involved in a conversation, working together or on site, what we might find is that those ideas get crossed over and eventually get sold off within the firm, and the individuals in Sage then pick them up (Product Manager, Sage).*

*I think the mistake we made with the Allison company was that we did not act quickly enough to bring them in as part of the Rolls Royce family, and I think some of the lessons we learnt were that you need to integrate as quickly as you can because if you do not integrate quickly, then barriers start to be put in place. Immediately after the acquisition, people tend to be fairly open and after a period of time then they become less open (Director Technology and Operations, Rolls Royce).*

*Well, acquisitions newly purchased sometimes have not been successful in growing the business. I think one of the strengths internationally is that we allow the acquired companies to retain their national status. We remain quite entrepreneurial with a lot of the key people still involved (Mergers and Acquisitions Manager, Sage).*

*The successful integration of acquired businesses into our local operations has ensured that this year's acquisitions are already working effectively with our existing activities (Chairman, Sage- Annual Report 2005).*

Utilisation of the capabilities and skills achieved as a result of the acquisition is done through working on projects together with new colleagues, sharing ideas and best practice in both acquired and acquiring firms. One of the reasons for making acquisitions to develop DCs is to learn from the acquired firm, so the managers would not want to destroy the inherent firm capability and the culture that they have. To ensure smooth integration, firms have to embrace the new culture and use it to enhance their own cultural capability by taking on board the best aspects of the acquisition but at the same transplanting the best of their own culture.

There are certainly some limitations when using acquisitions to develop DCs. The different cultures of the acquired and acquiring firms are a big hurdle during the integration process, which might end up with a destruction of the capabilities that were
purchased. So part of the challenge of any acquisition is how to bring it into the acquiring firm's culture, how to embrace it within that culture, how to get the acquired firm to actually want to change and operate in a somewhat different way. The Director Operations and Technology, Rolls Royce, explains one of the ways to overcome this hurdle:

>You have to acquire quickly, bring the acquisition within the family and culture of the firm and that can be a problem, particularly with firms where the cultures are quite different, so they have to become part of Rolls Royce. Rolls Royce has a very specific culture and very specific way of doing things.

Further, legal issues on intellectual property of countries often impede the smooth integration and sharing of best practices from offshore purchased firms. The acquired firm goes through several bureaucratic procedures to transfer the skills and intellectual property purchased to achieve the aim of gaining skills and capabilities from acquired firms offshore to develop and renew DCs.

Although there are limitations when using acquisitions to develop DCs, they are a good way of obtaining capabilities externally for the firm. Through continuous acquisitions, people, technology, intellectual property, skills and experience are transferred into the acquired firm. This acquisition brings knowledge, capabilities and skills to address certain issues in the firm. When used, these bring change into the firm, and hence changes in the abilities to carry out successful acquisitions. The ability to select, appraise and integrate acquisitions, and the continuous process of making and managing them lead to the development and renewal of DCs.

6.9 LEARNING

Learning is associated with the development of DCs (Nelson and Winter, 1982; Danneels, 2002; Zollo and Winter, 2002; McPherson et al., 2004). All the activities identified in the data for developing DCs bring knowledge, skill and experience into the firm. It was identified from the data that learning acts as an intervening mechanism between the activities conducted and the development of DCs. The rationale for conducting learning is to maximise and retain the value from the knowledge and experience created in the firm. To develop DCs through learning, the firm requires
processes, a dedicated team and people to carry out the functions, and shared knowledge and experiences.

Learning is a planned and structured procedure using many formalised and non-formalised systems to retain and utilise knowledge in the firm. From the viewpoints of the Performance Monitoring Officer, and Vice-President Marketing, Rolls Royce, learning is:

_A mixture of formalised systems which you can have, which will give every simple understanding, but fundamentally, if you want to know what you want to know, then you talk to any of the people doing the job (Performance Monitoring Officer, Rolls Royce)._ 

_The exchange and continuation of knowledge. Through our continuation of knowledge we have created expert learning systems, so the skills of the experts are not lost when they go. ...The sharing of knowledge is really achieved by, for example at the OBUs, the way we share it is to put all the people who need to make fan blades into one box. So you do not need to share the knowledge outside because you have them in the areas of expertise (Vice-President Marketing, Rolls Royce)._ 

There is a dedicated team who develop techniques, processes and tools to help manage knowledge and to ensure that knowledge and best practices are shared across the entire firm and utilised. In Rolls Royce, there is a dedicated team that manages knowledge in the firm:

So we have a knowledge management team and they have been for years looking at techniques and processes, tools to help manage knowledge better in the company. So they have looked outside at what other people have done and so we have learnt from BP, US Army, certain techniques that they have employed. We have been sponsoring research in UTPs around learning activities and how we can do it. We sort of brought these things into the company, championed them and supported their being applied to the benefit of the company. So it is something that we recognised for probably about ten years as an important area (Senior Electrical Engineer, Rolls Royce).

To manage knowledge in the firm, the team uses training programmes, working with other departments to get them to recognise the kind of tools they use and to rotate people to perform other roles. In addition, the team also benchmarks with other firms to identify best practices in learning. The firm also sponsors research programmes to identify best ways of managing knowledge in their firms. Learning can take the form of continuation of knowledge and sharing of knowledge. Continuation of knowledge
involves expert learning systems that are created to capture the knowledge of experts before they leave or retire from the firm. With sharing of knowledge, all the knowledge needed for a particular production is located in one place where expertise and experience are shared during operations. The firms also share knowledge with external partners such as the UTCs and suppliers or business partners.

There are three different types of learning used to develop DCs in the firms, and these are (1) knowledge creation, (2) knowledge capture, and (3) knowledge articulation and utilisation, as suggested by the Manager, Mergers and Acquisitions, Sage, and the Business Development Manager, Rolls Royce:

*I think we are in a phase of development where organisational learning is almost about documenting processes and best practices that we have around the business because we are quite maturing in some ways and have grown so rapidly. I think that is the key thing, laying down these best practices (Mergers and Acquisitions Manager, Sage).*

*I think it is a mixture. I think learning and knowledge capture is important for Rolls Royce at this point in time because we recognise that our capabilities will change, we recognise that our skills sets will change, and we also recognise that some of the most experienced people will over time leave. So to allow us to move on, we probably have to have a pretty good understanding of all the knowledge within the company and capture that (Business Development Manager, Rolls Royce).*

Knowledge is created in the firm through the internal and external activities identified in this study. This knowledge, once created, has to be retained and utilised in the firm to develop DCs. Maximising the knowledge and the experience created helps the business to develop the ability to tap the full potential of their knowledge, skills and experiences, and this is achieved through knowledge capture. Two different types of knowledge are captured, tacit and explicit. The firms laid emphasis on tacit knowledge as critical for developing and renewing DCs because it is not observable and therefore could be a source of competitiveness as opposed to explicit knowledge.

Explicit knowledge is observable and easy to capture and is found in processes and procedures, which can be codified into manuals. Explicit knowledge is captured through knowledge management teams working with the various departments and recognised industry experts to identify and document their procedures and tools. The knowledge management team also work with experts who are about to retire from the
firm to document their experience and expertise. Again, people in the firm document information from experts, remarkable best practices from non-competitors, dealings with the after-market, and lessons learnt in project reviews. The latter are processes in which people working on specific projects write out their lessons learnt and review them accordingly. Knowledge is then codified into databases and stored on computer systems referred to as capability intranets which represent the corporate memory and operation rooms of the firm, where people go to get information required for specific projects.

Tacit knowledge, however, is not observable; it is context-specific, very practical, and hence difficult to capture and codify and, according to the R&D Manager, Sage, there is no requirement to codify tacit knowledge:

If it is tacit knowledge, there is no requirement for people to actually document that and it may well be that it never gets documented. It just gets passed around organically.

However, since it is the most important knowledge base for developing DCs, the firms have developed some ways of capturing tacit knowledge to some extent. It can be transferred through both formal and informal systems. Formally, tacit knowledge is transferred through mentoring, on-the-job training, and within discussion groups. Informally, tacit knowledge is transferred organically through simple methods and tools, which involve interactions with people. During these people to people interactions, experience and skills are captured through story telling, lessons learnt from previous projects, and best practice sharing. It is important to have a supportive culture of trust in the firm to ensure that members share information freely without feeling threatened in any way, and the firm's sources of competitiveness are not divulged to competitors.

To gain the full potential of the knowledge captured, it has to be used. Knowledge articulation and utilisation are the medium by which knowledge and best practice are shared in the firms. Some of the managers elucidated the various ways through which knowledge is articulated:

So we have done a number of things. We developed a community of practice as a methodology and encourage that. The community of practice tends to be an informal network of people who have a common interest of some kind... where
people have particular interest in a particular topic so they can share questions and lessons learnt; that is very useful (Company Specialist, Rolls Royce).

So through the internal systems we have here there are public folders where you can set up message streams on a particular technology discussion of particular technologies, and so on. Through the e-mail systems we have public folders where knowledge can be interchanged (Senior Electrical Engineer, Rolls Royce).

The organic route is the best one for us and Sage works very well with the sort of contacts and networks between people within Sage, and that is one of the strong points (Product Manager, Sage).

What we have is a web-based E-team, where each management group or team posts information regarding what they are doing or certain things that they are working on, and then anybody in that group can access and read that information, and use it as they see fit (R&D Manager, Sage).

The tools for articulating knowledge in the two firms include capability intranet, training programmes, and community of practice. The capability intranet is a computer-based storage of knowledge, which employees can access for knowledge that is relevant to their type of work. The knowledge management team in the firms run training programmes to update employees on the knowledge that is available and relevant to their work. Further, knowledge is also articulated through setting up communities of practice. These are informal networks involving employees with similar interest who come together and share knowledge and best practice on particular subject areas of their work. To develop DCs, employees have to utilise the knowledge gained to bring changes into the procedures and operations of the business.

Learning is very important in developing and renewing DCs because it is the way by which skills, experience and knowledge are shared and used to renew and develop new processes and innovation. When organisations learn, it provides information about competitors, customers and partners, and it creates a common understanding of the operations and processes of the firm, as well as where to find information for work-related activities. The employees of the firms learn through processes and tools. As a result of the continuous creation, capture and utilisation of knowledge, the firm is equipped with current information, knowledge and skills needed to adapt to the changing dynamic environment. Hence, the firms develop the ability to do generative and adaptive learning, develop market orientation, ability to be innovative, and ability to manage knowledge, HR, collaboration and acquisitions, effectively.
6.10 OUTCOME: DYNAMIC CAPABILITIES DEVELOPED

Through the continuous process of developing and renewing DCs, firms acquire explicit and tacit knowledge, know-how and skills, intellectual capital, new processes, experience, efficient technology and innovation to improve their existing capabilities and develop new ones. The process therefore leads to the development and renewal of certain DCs, which when applied appropriately, enable firms to conduct business successfully and sustain their competitiveness in dynamic markets. As a result of developing and renewing DCs through in-house innovation, human resource activities, collaboration, acquisitions and learning from these activities, the following DCs were identified:

1. Innovativeness
2. Market orientation
3. Ability to manage human resources
4. Ability to manage knowledge
5. Ability to manage collaboration
6. Ability to manage acquisitions.

The process of creating DCs does not end with the development of the DCs identified; rather they are continually reviewed in the light of new challenges in the internal, operating and remote environments. The DCs are then renewed and new ones developed through the process identified. From the data analysis, the participating firms have DCs. The following excerpts from the data confirm this:

*I think we have dynamic capabilities partly because of the nature of the aero engine business, partly because of the diversity of businesses we are exposed to, so we can bring less influence on certain products as opposed to other products and partly because of the interconnectedness of our industry. For example technology, which is pushing the development of an aero engine, could be applied to improve the performance of marine. So, in terms of our current businesses I think we are dynamic and responsible. (Business Development Manager, Rolls Royce).*

*I think Sage has a set of strong capabilities but in order to maintain our competitive advantage the firm has to be willing to change. Change is obviously the key thing, and I mean Sage capabilities, directions or whatever, change is something that we have to be opened to (Mergers and Acquisitions Manager, Sage).*
I think yes, it is a dynamic company and there has been a huge amount of change in Rolls Royce. If you would say to me is it changing as fast as it needs to, well that is probably true of most companies. You know we all like to move some of these things a little quicker than they are going at the moment, but I think it is a dynamic company (Director Technology and Operations, Rolls Royce).

For example, Rolls Royce has DCs because they have intimate knowledge of how to generate engines and, most importantly how to transcribe that into mechanical arrangements, which physically work. According to the Chief Executive Officer, Rolls Royce, in his annual review in 2006, stated that:

"We operate in a competitive and challenging environment and, in doing so, we benefit from a consistent strategy, a strong order book, long programme life cycles and the revenue generated by the provision of value-added services to the users of our products. Consequently we have good visibility of our future workload and market opportunity. The results in 2006 demonstrate the resilience of the Group and its business model."

Hence, Rolls Royce has DCs because it has experience, knowledge of the air frame and the engine, knowledge of how they apply these appropriately to bring certain components to be able to achieve those requirements not only for their current businesses but for their future businesses as well. The following section explains the different types of DCs identified from the study.

6.10.1 Innovativeness

The first type of DCs developed is innovativeness. It is an integrative and transformational DC. Innovation is usually an outcome-oriented measure, such as 'new product success' (Ayers et al., 1997; Menguc and Auh, 2006), whilst innovativeness captures the firm-level orientation toward innovation (Hurley and Hult, 1998; Menguc and Auh, 2006). Innovativeness is the firm's inclination to engage in innovative behaviour that departs from the normal ways of doing things in the firm (Zaltman et al., 1973; Hurley and Hult, 1998). Innovativeness is a firm's valuable resource, and a socially complex resource that is not easily transferable or imitable by other firms (Hult and Ketchen, 2001). The following quotes illustrate innovativeness in the two firms:

"So there is the ability to sense those requirements and document those and convert them into the appropriate software, product or service package (Director of Products, Sage)."
The ability to innovate is at the heart of our business and is the means by which we maintain our world-class position (Director of Engineering and Technology, Rolls Royce).

Clearly the ability to monitor and control product development such that the products mature when they have to and you deliver what you promise to deliver on time. That is particularly important because it can be a nice distraction if you have an existing problem in the business and you are unlikely to tackle that problem and renew your skills, then you will be missing out on opportunities in the future (Business Development Manager, Rolls Royce).

Thus, the DC of innovativeness identified in this study is the ability of the firms to continuously create value through new ideas and initiatives in such areas as R&D and NPD, firm processes, organisational structures, procedures, financial and business models, relationships with external firms and partners, suppliers, resellers and customers, as a platform for producing current and future products and services. This therefore involves the integration of resources and activities such as in-house innovation, HRAs, collaboration, acquisitions and learning to bring in new products, procedures and processes into the firms, which assist them to meet the changes and remain competitive in their business.

6.10.2 Market Orientation

The second type of DC identified is market orientation, which is an integrative type of DC. According to Kohli and Jaworski (1990: 6), market orientation is "The organization-wide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organization-wide responsiveness to it". Market orientation consists of three behavioural components: customer orientation, inter-functional coordination, and competitor orientation. Customer orientation is a set of beliefs that put the customers' interest first (Deshpande et al., 1993). Competitor orientation is the ability of the organisation to generate, disseminate and use superior information about competitors (Kohli and Jaworski, 1990). Inter-functional coordination is the coordinated application of inter-functional resources to the creation of superior customer value (Shapiro, 1988; Naver and Slater, 1990). The statements from the Business Development Manager, Payroll, Sage, and the Business Development Manager, Rolls Royce, note this:

So we have customers, accountants, business partners, and now we are much more aligned with needs of each of these customers. So we have developed the
capability of being more in tune with different customer communities and their different requirements (Business Development Manager Payroll, Sage).

We have done things like work very closely with the air framers. Supposing you are an engine manufacturer you can work closely possibly with your direct customers to try and make sure you understand fully what it is they need, so you develop capabilities (Business Development Manager, Rolls Royce).

From the findings of the study, customer orientation is developed through the continuous process of creating and managing close customer and partner relationship in the firm. This is the ability of firms to develop close relationship with customers and partners through communication, continuous exchange of information about the needs, problems and emerging requirements of customers. Also, through business models, direct, indirect and joint problem solving through successful collaborative relationships. Competitor orientation is developed in the firms by generating information about competitors through business intelligence, benchmarking, networking with partners and suppliers, and assessing firms’ current developments in relation to competitors (Kohli and Jaworski, 1990). The firms use the information to create knowledge, flexibility and speed to adapt to changes that occur in their operating environment quickly, and to take advantage of some opportunity that occurs in the operating environment. Further, inter-functional coordination is developed through the integrated and coordinated efforts and resources of the different business units, departments, matrix organisational structure, and various business models and project teams towards delivering superior value for their customers.

6.10.3 Ability to Manage Human Resource

The third type of DC developed is the ability to manage human resource to develop intellectual capital in the firm. It is a transformational DC. According to Armstrong, (2006: 3), "Human resource is defined as a strategic and coherent approach to the management of an organisation’s most valued assets – the people working there who individually and collectively contribute to the achievements of its objectives". In the firms, human resources are viewed as a source of competitiveness. The grounded data suggest that DCs are developed through highly developed employee skills, people management processes and systems. The Head of Strategic Research Centre, Rolls Royce, and the Director of HR, Sage, illustrated this:
I think we are good as a company in developing people that is another capability, recruiting and developing people. It is a key capability because if you do not have the right people to develop your engines, support and service them, sell them to the market, then you are not going to survive. The capability of developing people every time is also vital to meet the changes in the business because our business is not static; it changes over the time (Head Strategic Research Centre, Rolls Royce).

And that is purely dominant, the power behind Sage management is people and the people are given the capability because they are given the autonomy and the accountability to deliver, and I believe that is one of our greatest strengths in the empowerment of our people to do what needs to be done properly (Director HR, Sage).

Therefore, having the right balance of people with the right skills, experience and intelligence is fundamentally important to the drive of the business. It is the people who deal with the customers, processes and technology, and therefore the need to develop the highest ability in that area. Through continuous HRAs such as bringing in knowledgeable and technically skilled people, developing them through training programmes and career development, the firm develops and renews its ability to manage and transform the human resources in the firm. To develop this DC, the firms in addition use in-house innovation to develop people processes, collaborate with universities to bring in new people, and make acquisitions for skills of other firms. The firms learn from the experience of these activities to develop the ability to manage HR and to develop other DCs.

6.10.4 Ability to Manage Knowledge

The fourth type of DC developed is the ability to manage knowledge in the firm, which is a reconfiguring type of DC. "Knowledge Management refers to the critical issues of organisational adaptation, survival and competence against discontinuous environmental change. Essentially it embodies organisational processes that seek synergistic combination of data and information processing capacity of information technologies, and the creative and innovative capacity of human being" (Malhotra, 2005: 15). The goal of knowledge management is sustained individual and business performance through ongoing learning, unlearning and adaptation. The Company Specialist, Rolls Royce, commented on this:

I suppose what you do when you use knowledge to do something is that you create new knowledge because you find better ways of doing things. That is why
so often the best team to design the next thing is the one that did the last one because they have got a lot of knowledge already there.

This DC involves the firm’s ability to manage and retain the value from the knowledge and experience created, and utilised to impact on performance of the firms. The ability to manage knowledge is developed through continuous knowledge creation, capture, and articulation and utilisation procedures. Through learning, the firms apply the knowledge and skills developed, which leads to development of DCs.

6.10.5 Ability to Manage Collaboration

The fifth type of DC is the ability to form and manage collaboration. This is a resource-gaining and reconfiguring type of DC. It involves the ability of firms to form and manage relationships, alliances and partnerships with other firms to access desired capabilities required (Andersson and Kaplan, 2004). Managing collaboration emphasises the ability of firms to combine complementary resources and capabilities, which involves the potential synergies of firms to jointly create unique new products, services or technologies and values for the firms (Dyer and Singh, 1998).

The findings from this study show that the DC of collaboration is developed through the formation of relationships, alliances, research partnerships with suppliers and partners and networking. The Senior Electrical Engineer, Rolls Royce, maintains that collaboration brings capabilities into the firm:

Certainly it brings capability to what we can do, it has enabled us to do more with the knowledge that we have already got. Some of the JVs have been very, very successful.

With the continuous ability of the firms to combine and share their skills and knowledge through cross-functional teams, expertise and working on a particular project deliver instant capability acquisition and utilisation, which enhances the DCs of the firms.

6.10.6 Ability to Manage Acquisitions

Acquisitions lead to the development of DCs (Henderson and Cockburn, 1994; Zollo and Singh, 1998; Eisenhardt and Martin, 2000). The essential task of any acquisition is to create value. The management of the analysis, negotiation and internal selling and
integration of the acquisition is important to develop DCs. Capability transfer in the acquisition process requires creating and managing the interdependencies in both firms (Haspeslagh and Jemison, 2004). Thus, a key determinant of the integration task is the interdependence between the two firms and how the interdependence is managed.

The findings of this study revealed that the two firms develop the ability to manage acquisitions, as the quotes from two of the managers suggested:

*The ability to make acquisitions without sacrificing the capabilities that are already there is very important. If you want to be a dynamic company, then you must be able to acquire capability quite quickly and not destroy it* (Business Development Manager, Rolls Royce).

*It is sometimes easier and quicker to acquire them than to move into a market. So I would say that has been the driver of this institution. We have the ability to do it because we have strong cash flows and also because we want to grow the customer bases, and that is the strategy that still applies, particularly on large acquisitions and especially those acquisitions in new markets* (Mergers and Acquisitions Manager, Sage).

This DC is developed through the continuous structured approach of procedures and innovation for analysing and selecting acquisitions, the appropriate selection of integration approach for the acquired firm, managing the interdependence between the acquired and acquiring firm successfully, and gaining the capabilities acquired without destroying them. The firms build up the experience and skills and learn from them. This enhances their ability to conduct acquisitions successfully to develop and renew DCs in the firm. The DC of managing acquisitions enables the effective creation and management of the interdependencies in the integration process of acquisitions.

### 6.11 SUMMARY

The aim of this chapter was to present the findings of the substantive theory developed. A full theoretical discussion of the substantive theory was presented, using a model with illustrative examples from the data. The components of the model were briefly explained in a table and then each component of the model was discussed using the grounded data from the interviews to support the points made. The theoretical discussion examined the main features of the process of creating DCs, and explained the continuous and sustained internal and external developmental approaches through
the following activities: in-house innovation, human resource activities, collaboration and acquisition. It explained how the firms learn from these activities to develop DCs of innovativeness, market orientation, and ability to manage HR, knowledge, collaboration and acquisitions. The continuous ability of the firms to undertake this process successfully leads to the development and renewal of DCs. The outcomes of the process of developing these DCs were also explained. The findings of this study revealed that developing DCs is a process which is planned and/or emergent, involving both internal and external development approaches.
CHAPTER 7 DISCUSSION OF SUBSTANTIVE THEORY

7.1 INTRODUCTION

This chapter presents a discussion of the substantive theory developed. The first part of the chapter explains how two DCs are created, using the model developed in this study. The second part then discusses the theory in relation to the literature on the process of creating DCs and the various components of the theory. This discussion of the theory focuses on how the literature is either similar or different from the theory of the process of creating DCs developed in this study.

7.2 DISCUSSIONS OF THEORY

In Chapters 1 and 2 of this thesis, it was identified that although the concept of DCs is seen as a potential source to achieve and sustain competitiveness in dynamic markets, the literature lacks a coherent theory that explains how DCs are created at the strategic level. To fill this gap in the literature, this study has created an empirically grounded substantive theory that describes the process through which DCs evolve at the strategic level. The theory emphasises (1) the conditions that trigger firms to develop DCs, (2) the strategies used, (3) the activities adopted, (4) the type and role of resources in the development process, and (5) the need for learning as an intervening mechanism for creating DCs. This is a coherent empirical theory of the process of creating DCs at the strategic level. The theory is illustrated in a discussion of how the DCs of 'innovativeness' and 'market orientation' are created\(^\text{13}\).

7.2.1 Process of Creating DC of Innovativeness

This involves the various actions of the process through which the two firms develop strategies, and select resources and activities to create the DC of innovativeness.

\(^{13}\) For ease of reading, how two DCs are created has been exemplified using the developed model. However, this will involve some overlaps from Chapter 6. Also, occasionally, the reader will be referred back to sections of the substantive theory in Chapter 6.
7.2.1.1 Improve and sustain competitiveness

The two firms develop the DC of innovativeness as a result of certain external challenges in the environment. The external causal conditions for developing this DC include customer demands for better products and services, legislative requirements that vary from government legislation to worldwide legislation on products, operating standards and the environment, technological changes, and the competition within their markets. Due to these challenges, firms have to develop this DC to enable them to improve and sustain their competitiveness by bringing new products, new business processes and new business models to market, and to gain first mover advantages. To meet these challenges in their markets, the firms subsequently adopt certain strategies to develop this DC.

7.2.1.2 Strategies for developing DC of innovativeness

The two participating firms adopt both planned and emergent strategies to develop the DC of innovativeness. The planned strategies include the business and product strategies. The business strategy specifies the types of investments the firms make to develop and improve upon their products and services. The product strategy describes the types of products and capabilities (zero-level capabilities) required and how to develop the products. The product strategy document therefore shows details of the research and development (R&D), research and technology (R&T), and new product development (NPD) investments to develop the products and services, and therefore how to develop and renew the DC of innovativeness. Although the firms have planned strategies, when developing this DC, most of the strategies used were emergent. The strategy emerges during the process of people working, undertaking generative and adaptive learning through R&D, R&T, and NPD, gaining new ideas from recruited people, and generating business intelligence. The firms develop new ideas and procedures for innovating in the business to develop DCs. The Product Director, Sage, noted this:

*Everyone has planned strategies but they never get followed fully. We certainly have plans, but we look at a particular technology because we have seen it emerging and it is beginning to gain some tracks.*
Further, the managers in the two firms maintain flexibility in their planned approach and this allows them to change the course of a project to incorporate emergent ideas, opportunities and changes. To develop the DC of innovativeness, the planned and emergent strategies have to be implemented. The participating firms therefore identify key resources and make decisions on the types of internal and external development activities such as in-house innovation, HRAs, collaboration and acquisitions to develop DC of innovativeness.

7.2.1.3 Key resources, type of development and activities

This part of the process explains the key resources and the types of development activities employed.

7.2.1.3.1 Key resources required to develop DC of innovativeness

The participating firms use both tangible and intangible resources to develop the DC of innovativeness. The tangible resources are both financial and physical. Financially, the participating firms need money to invest in activities such as R&D, R&T, and acquisition of other firms for technology, skills and capabilities to develop and renew this DC. The financial resources involve a variation of internal and external sources of funding, which enable the firms to invest in R&D, R&T projects; to attract the right people; to provide facilities for training and education; and to collaborate and acquire other firms. In addition to the financial resources, the firms require physical resources such as testing and training facilities for developing and testing products and IT. The physical resources provide the firms with the necessary infrastructure and equipment to experiment for new ideas, to network with other colleagues and share best practices, which promotes learning and provides the knowledge and experience to assist with the development of the DC of innovativeness.

The firms also use intangible resources such as human capital, structural capital and relationship capital. To develop the DC of innovativeness, the firms require skilled people and integrated teams with technical skills, knowledge and high-levels of creativity to innovate things such as products and processes in the firm. The firms provide them with the right environment, such as structured procedures for innovation and a culture that fosters it. In the two participating firms, the right environment for
continuous innovation includes procedures for product development, agile business models, the ownership and empowerment of employees, entrepreneurial culture, the commitment of senior management, and a transformational leadership at all levels of the firm to ensure continuous innovation. These provide the employees with the motivation to initiate new things and aspire to take on new challenges to perform. The firms also require relationship capital to develop the DCs of innovativeness. They develop close relationships with customers and partners through direct and third party networking. The firms use schemes such as service contracts, social events, research, conferences and direct interactions with customers and partners to get them to understand their products and services, as well as gather information on these. This assists the firms to obtain feedback on their products and services. The information gained from their customers and partners assists the firms to innovate new and improve on existing products and service to satisfy their customers. These resources identified are combined with certain internal and external activities to develop the DC of innovativeness.

7.2.1.3.2 Internal and external activities for developing DC of innovativeness

The firms develop this DC through internal and external activities. The internal activities involve the use of in-house resources, skills and capabilities, and externally the firms collaborate with other firms and/or acquire other firms. The next sections explain how these activities are conducted.

7.2.1.3.2.1 In-house innovation

The firms use large scale in-house innovation such as business scope, organisational and structural to develop the ability to innovate. Through the business scope innovation they make consistent investment in R&D, R&T, and NPD, while also monitoring competitors to identify new developments in their markets. The Head of Strategic Research Centre, Rolls Royce, noted this: “We have a very solid research basis on which we can grow new technologies”.

Through consistent investment in R&D, R&T, NPD, and generation of business intelligence, the firms keep up with the competition in their operating environment by innovating new products and services, thereby gaining first mover advantages. They also invest in organisational and structural innovation to develop organisational
structures, business processes, and innovative systems of working with customers and partners which support the effectiveness of the business scope innovation. According to the Business Development Management, Rolls Royce:

*We offer the customer clearly full support for our existing products. We also offer a number of deals by which we do risk analysis for them, so we guarantee products in the deal.*

To develop the ability to innovate, both firms develop business models (e.g. service, financial) that are creative, flexible and reliable to support their products, and offer good customer support to partners and customers. Managers have used these models to build close relationships with and to provide maximum customer service to their customers and partners.

These innovative activities therefore assist the firms to develop skills, new products, and new business processes, and generate new ideas in technology, business models, organisational structures, and potential new business opportunities. However, just gaining this experience and knowledge does not automatically lead to the DC of innovativeness. The firms learn and apply the knowledge and experience gained for new innovation. Hence, the continuous innovation and learning from these activities assist employees in the firm gain experience and knowledge. This therefore assists the firms to develop and improve their ability to influence the procedures and practices of conducting business scope, organisational and structural innovation.

In addition to in-house innovation, the participating firms also bring in new people with experience and skills, train existing employees, collaborate with universities and partners to develop new processes and technology, as well as acquiring other firms to assist with the development of the DC of innovativeness. For example, a UTP between Rolls Royce and Oxford University, to innovate a measurement technology for monitoring aircraft health when it is still flying. This improved the ability of Rolls Royce to innovate new technology which enhanced the performance and reliability of their engines. The next section explains how these activities are conducted in the two participating firms.
7.2.1.3.2.2 HRAs

The data highlighted that to develop DCs of innovativeness firms need people with appropriate expertise and skills who also have a high level of creativity. To achieve this, the firms carry out a large number of HRAs which include recruitment, people development and training. This was noted by the University Liaison Officer, Rolls Royce:

*We certainly do it through recruiting and we are increasingly looking for people not only with strong sort of mechanical and aerospace engineering background, but also with a good insight of electrical issues.*

Both firms bring in new people with expertise, skill and high level of creativity, such as technical, specialist and domain experts, through recruitment. Recruitment involves hiring people from other industries or departments to augment the existing skills and capabilities in the firms. The new people recruited bring in new ideas, knowledge skills, and new procedures for innovating. The firms learn new work practices and procedures to assist with the development and renewal of procedures for innovation. With the continuous recruitment of people with high levels of creativity and expertise, both firms consistently learn from the new skills, procedures and knowledge. This is applied to the operations of the firms to improve upon the skills, and procedures for innovating, and enhances the ability to influence the business scope, organisational and structural innovation in the firm.

For example, Sage recruited a project management expert for their MMS product (mid-market solutions) to help grow its project management expertise, which led to the improvement of their development processes. According to him, "*One of the first things I personally did when I came into Sage was to introduce a bit more rigour to our development processes because in one of the previous projects that I met here, they were developing the infrastructure in parallel with the functionality*”. He stated that developing a large software project is inherently risky and the highest risk elements are always the infrastructure. "*So whenever we look into building a new product the first thing we focus on is to get the infrastructure correct, that the foundations are solid enough to build that product, and then when we come to actually building the functionality of the product we know we can do that with the high degree of certainty that the infrastructure is solid*" (MMS Manager, Sage). However, before this new
approach, Sage was changing the underlying infrastructure at the same time as building the software, which is just an additional risk. It created problems because it was extending the delivery schedules, creating unnecessary reworking, and hindering proper investigations because when the underlying infrastructure is changing it is difficult to identify whether the problem is related to functionality or to the infrastructure. So the MMS manager introduced the incremental approach which involves validating the infrastructure first, undertaking overall proof concepts exercises to ensure that all of their technical approaches were valid before commencing to build the product.

For instance, if they are building ten features in a product using the incremental approach, once the development team has built one feature area, it will be handed over for testing and because of the process they have undertaken at this point, if they know that feature area one works, they will start developing feature area two, and the development of feature area three will follow. If at this point it has not broken anything associated with these feature areas, they can deliver the product at this stage. So, if there is a change in the market, Sage could happily change, for example, features four, five or six, because they know the progress and the change would have no impact on their development cycle. The new development process therefore enables Sage to react to changing market conditions through the ability to innovate products to meet them. So through the recruitment of the MMS Manager, Sage was able to improve upon its procedures for innovation of products.

The firms also develop their employees through identification of potential highfliers or talent, personal development, and career development activities. The intensity of people development activities goes right across the entire firm. Employees at all levels are developed throughout their career through continuous skill and knowledge development. This was emphasised in both firms:

*I think we are good as a company in developing people. That is another capability, recruiting and developing people (Head of Strategic Research Centre, Rolls Royce).*

*Development is giving them a career path and a progression which allows you to grow those capabilities and then grow those people to a point where they can be called experts in their field (Manager Technical Support, Sage).*
The people development activities assist the firms to develop the DC of innovativeness because the managers build and enhance the skills and knowledge base of their people. The employees are highly motivated and reluctant to leave, and therefore the intellectual capital is retained in the firm. Through the retention of the experts and people with high creativity in the firms, they have the necessary skills, expertise to innovate, and develop a wealth of experience and knowledge in innovation. Through learning, the knowledge is shared amongst employees and applied to the operations of the firm to enhance innovation. Through the continuous learning and application of the knowledge and skills, the firms develop and renew their ability to innovate.

In the two firms, the Training Department organises training programmes such as process-based learning, project management, development programmes, on-the-job training, technical learning, graduate training programmes, and big demonstration programmes to develop and improve their skills to innovate. These are organised for employees based on inputs from their managers (from development reviews) or capability skill owners. These inputs specify the skills for innovation which constantly have to be updated, such as modelling skills, project management skills, aero-dynamics and engineering skills. For example, according to the Director Technology and Operations, Rolls Royce:

> We do get into quite a detailed definition within the skill group of the different types of skill that are required and therefore we ask them to build up a picture of what those skills are, what we have, what quantities, and where we have them. Because we have engineers in Derby, Bristol, Indianapolis, Montreal, all over the world, we need a total picture of what we have got, where we are strong, where we are not so strong, what we need to do about where we are not so strong. So that is why they have an important role in making sure that we do have the right people and that blend of capabilities.

These training programmes are made available and relevant to the operations of the business. People in the firms are trained for both current and future roles in R&D, R&T, NPD and project management on a continuous basis through a classroom-based training programme, support from experienced employees, and on-the-job learning. Training assists the firms to renew and improve upon the research, creative and project management skills of their employees. The Head of Strategic Research Centre, Rolls Royce, commenting on this, stated that:
Increasingly you find a lot of training is focused on developing more personal capabilities and the ability to work in teams, which helps the processes in the company. So a lot of learning is focused on developing the personal qualities which is linked to the process improvement because people are sort of compelled to keep track of the latest management theories and also to keep up with the latest thinking. Hence, our training is up to date and in line with some of the latest thinking.

The employees use the new skills and knowledge to innovate new products, business models and processes to aid with the operations of the business. The experience and knowledge gained from the training are applied to the operations of business which assist the firms to develop and improve the ability to conduct in-house innovation (see section 6.8.1.2).

7.2.1.3.2.3 Collaboration

The firms also collaborate with external stakeholders to develop innovativeness which varies from equity to non-equity collaboration. The types of stakeholders include manufacturers, suppliers, customers, partners, universities, and professional bodies. They carry out different levels and numbers of collaboration to develop the DC of innovativeness. The types of collaboration identified were alliances (or JVs) and research partnerships with competitors and others.

The firms enter into JVs with other firms which contribute to the development of the DC. JVs are typically formed to gain a crucial piece of technology, intellectual capital, bring together specific skills, resources, and acquire capabilities in ways that may complement each other. For example, Rolls Royce has many JVs, and about 40% of their engines are manufactured through JVs:

The development of effective partnerships continues to be a key feature of the Group’s long-term strategy. Major partnerships are of two types: joint ventures and Risk and Revenue Sharing Partners (Financial Director, Rolls Royce-Annual Report, 2004).

Through the formation of JVs, the firms use the skills, managerial, manufacturing and technical capabilities of partner firms for innovation and managing specific innovative projects. The JVs assist the studied firms to improve upon their ability to innovate because through the JVs they are able to assess and instantly use already developed skills, intellectual capital, innovation procedures, and new technology developments.
The formation of JVs assists in the development of the DC of innovativeness in two ways. The firms may gain intellectual property rights from the JVs. These skills and knowledge are retained in the firms and through learning are articulated and utilised to improve upon their ability to influence procedures to innovate new products and services. Alternatively, the firms when participating in a JV use the capabilities of partners to innovate products and services without necessarily gaining knowledge or capabilities, because all the innovative activities are conducted outside the firm which only receives the end product. This type of JV improves the ability of the firm to innovate through gaining new products, technology, procedures and services to be competitive, without necessarily accumulating knowledge and capabilities within the context of the firm, For example, Rolls Royce JV with SAIC (Science Application Inc.) in 1999, was primarily about expertise. SAIC has very good expertise regarding software for monitoring systems. Rolls Royce requires this expertise to control their engines in the after-market to gain the ability to monitor engines when they are out of service, gather the data, and make decisions about how the engine should be controlled regarding maintenance. SAIC has been doing this sort of systems monitoring for a very long time for staff in the nuclear business. Rolls Royce therefore developed a JV with SAIC called DS&S (Data Systems & Solutions) concerned with the management of the fleet of engines that Rolls Royce has in service. SAIC supplied the software capability for monitoring complex systems. According to the Director Technology and Operations,

*It was a win-win situation. SAIC wanted to get into things other than their traditional monitoring which is a nuclear power station. We wanted their capability for monitoring our engines that are out of service so that has been a very successful joint venture I think.*

So clearly, Rolls Royce gained expertise to improve performance of engines, and ideas to incorporate into developing further, but did not accumulate knowledge in the firm.

Another form of collaboration for developing the DC of innovativeness is research partnership with other firms. For example, Rolls Royce has partnerships with universities to carry out research and technology development called the university technology partnerships (UTPs), as already mentioned. Through this partnership the

\[14\] In early 2006, SAIC exited the joint venture agreement, making Rolls Royce the sole owner of DS&S.
firm provides funding to the UTPs to conduct research to develop new technologies and business processes for the firm. The firm sets up specific projects on research and technology development in the universities and the university also invests further in research that could be beneficial to the firm. Through this partnership the firm develops very close beneficial relationships with universities which assist them to develop new technologies, skills, and share research and technology innovation. The Senior Electrical Engineer notes this,

*In terms of building up capabilities it is not necessary for the expertise in Rolls Royce to build up all the capabilities in-house, we look at building up capabilities within the UTCs themselves to which we have daily access. So in terms of the simple number of bodies that we have which do complex capabilities that we require for the future, that helps. We have seven people at the moment in my team here, and we have to release that number at each of these three universities. So it is much more client-focused, being in a physical area such as the UTC, in which they can incorporate the capabilities we need. So that helps us tremendously in looking at new technologies which are coming through, and how we may be able to utilise these technologies in the future.*

The continuous development and transfer of research, new technology and skills from the universities into the firm leads to the development of new practices, new technology, and procedures in innovation. The firm continuously learns and applies the knowledge developed within the universities to innovate in the firm. This assists the firms to develop and enhance their ability to conduct business scope, organisational and structural innovation in the firm.

The participating firms also develop the DC of innovativeness through the formation of a research consortium and development networks. The firms make some form of investment with partners, and competitors in European research projects, to conduct research in technology development programmes. With the research consortium and development networks, the firms invest a little of the investment required but they gain a great deal, because they have access to all the ongoing research and development. The specific research and development might not be exactly what the firms want but they gain knowledge to plan for future innovation. The firms could adopt and learn from some of these future developments and new insights from the research to improve upon their innovation.
With the continuous improvement in their innovation procedures, the firms develop and renew their ability to innovate. Collaboration therefore brings in additional skills and knowledge to the firms, which they do not have or could not develop at all to improve their innovation ability. The Director Technology and Operations, Rolls Royce, explained the background to a particular collaboration with a Singapore company, in which they gained manufacturing and technology expertise to develop their coating material, which improved their ability to innovate. He stated that the various parts that operate in the centre of engines get very hot and are subjected to oxidation and corrosion, because they are attacked by the gas flowing in. In order for them to survive in that environment, Rolls Royce has to put protective coatings on them. That is a very complex technological process and also very expensive, which requires cutting equipment which will cost £3-4 million to put in place. Traditionally, Rolls Royce bought those coatings from external vendors, which makes it vulnerable to a limited number of these vendors around the world. Since these vendors have made big investment of their capital base, they therefore want return on that. In some cases, this can lead to exploiting companies like Rolls Royce, because supply is limited and demand is significant. So Rolls Royce set up a JV with one of the coating suppliers to build a new factory to produce them. The JV involved a joint investment in which Rolls Royce invested intellectual capability. So Rolls Royce develops its coating within the context of that JV, and the supplier invest its expertise, the manufacturing technology, manufacturing engineering, and the knowledge of the equipment needed to do this type of coating. These are capabilities that Rolls Royce did not have, but with the collaboration it has been able to use them to improve its ability to manufacture the product required for the efficiency of its engines.

7.2.1.3.2.4 Acquisitions

DC of innovativeness is also developed through acquiring capabilities by buying other firms. For example, at Sage, acquiring other firms is the main external source of developing and renewing DCs. In the last 15 years, Sage has carried out 29 acquisitions. The main focus of acquisition is on those targets with proven technology or knowledge. The firms employ a well defined process for making acquisitions. Although acquisitions are handled on a case-by-case basis, the process for a successful acquisition to develop DC of innovativeness depends on (1) the
ability to select appropriate acquisitions, (2) the ability to appraise the financial returns available from the acquisition and, on that basis, the price that should be paid, and (3) the ability to integrate the acquired firm into the operations of the acquiring firm.

Through successful acquisition, the acquiring firms gain intellectual capital, business processes, technology, and capabilities. The acquiring firms then integrate the acquired firm's intellectual capital, business procedures, and capabilities. With the successful integration, the acquiring firms gain new procedures for innovation, already innovated products, and skilled people with high level of creativity to innovate. The new people apply their skills and procedures to innovate in the firms. Acquisition therefore brings knowledge, technology, skills, processes and experience, which lead to changes in the procedures for innovating in the firms. The people in the firm learn from these skills, experience and knowledge through best practice sharing and knowledge articulation, and this is applied to innovate in the firm. The continuous selection, appraisal and integration of acquisitions and the continuous learning from them leads to the development of the DC of innovativeness in the participating firms (see section 6.8.2.2).

7.2.1.3.3 Learning

The in-house innovation, HRA, collaboration and acquisitions bring knowledge, skills and experience into the firms. To develop the ability to innovate, the firms must learn from the knowledge and experience from these activities. To learn from these activities, the participating firms use structured methods such as formalised and non-formalised systems to manage information and retain and utilise knowledge. At Rolls Royce, there is a dedicated knowledge management team who develop techniques, procedures and tools to help create and manage knowledge to ensure that best practices are shared across the entire firm, and used through training programmes. These learning activities were emphasised by a Senior Electrical Engineer at Rolls Royce:

So we have a knowledge management team and they have been for years looking at techniques and processes, tools to help manage knowledge better in the company. So they have looked outside of what other people have done, and so we have learnt from BP, US Army, certain techniques that they have employed. We have been sponsoring research in UTPs around learning activities and how we can do it. We sort of brought these things into the
In addition, the team also benchmarks with other firms to identify best practices for learning in their firms. The firm sponsors research programmes to identify best ways of managing knowledge.

To learn from the activities, the firms first capture the knowledge and experience created which help the businesses to develop the ability to tap the full potential of their knowledge, skills and experience to innovate. The statement made by the Mergers and Acquisitions Manager at Sage supports this:

*I think we are in a phase of development where organisational learning is almost about documenting processes and best practices that we have around the business, because we are quite maturing in some ways and have grown so rapidly. I think that is the key thing, laying down these best practices.*

Two different types of knowledge are captured, tacit knowledge which consists of the skills and ideas for innovation embedded in the employees, and explicit which is the procedures and standards for innovating in the firms. Tacit knowledge is captured through both formal and informal systems. It is transferred formally through mentoring, on-the-job training, and within discussion groups. Informal transfer of tacit knowledge involves interaction with people during which experience, best practices, and skills in innovation are shared. Explicit knowledge is captured through working with recognised industry experts, retired experts, non-competitors, dealing with aftermarket and lessons learnt on projects to identify and document procedures, tools and best practices on innovation. This knowledge is documented into databases and stored on computer systems referred to as capability intranets. The firms laid emphasis on tacit knowledge as critical for developing and renewing the DC of innovativeness because it is not observable, and therefore could be a source of competitiveness as opposed to explicit knowledge on innovation.

After capturing the knowledge, the employees learn and apply this new knowledge to innovate in the firms. The Vice-President Corporate Venturing, Rolls Royce, gave an example of how they learnt from the creation and implementation of the ‘Derwent process’ (a new product introduction process) to develop a new process called ‘create customer solutions’ for innovating products presently. According to him, they learnt...
how an engine project using the ‘Derwent process’ was launched and stopped before the engine went to market. The lessons learnt on this particular project and procedures were documented. They learnt from the successes and failures of the Derwent process. The experience and knowledge gained were applied to create the new procedure of ‘create customer solutions’ for innovating, which has been improving year after year.

Knowledge articulation is the medium through which the knowledge and best practice and procedures on innovation are shared in the firms. The tools used for this purpose include a capability intranet, providing training programmes, and establishing communities of practice. Both firms run training programmes to update their employees’ knowledge and skills in innovation and communities of practice (CoP) to share knowledge and best practice on innovation. At Rolls Royce, the value of CoPs is evident:

> So we have done a number of things. We developed a community of practise as a methodology, and encourage that. The community of practice tends to be an informal network of people who have a common interest of some kind... where people have particular interest in a particular topic, so they can share questions and lessons learnt. That is very useful (Company Specialist, Rolls Royce).

In Sage, a more informal approach to communities is evident:

> The organic route is the best one for us and Sage works very well with the sort of contacts and networks between people within Sage, and that is one of the strong points (Product Manager, Sage).

Learning is very important in developing and renewing the DC of innovativeness because it is the medium through which skills, experience and knowledge gained from the four activities are shared and used to develop and renew processes and procedures for innovation. When employees learn, it provides knowledge about competitors, customers and partners, and it creates a common understanding of the operations, processes of the firms, and where to find information for innovation. Employees therefore learn through processes and tools. As a result of continuous capturing and utilising knowledge created from the four activities, the firms are equipped with current information, knowledge and skills they need to innovate to adapt to the changing dynamic environment. Through knowledge creation, capturing, transfer and utilisation, the firms develop the ability to do generative and adaptive learning, which leads to the development of the DC of innovativeness.
7.2.1.3.4 Outcome of process - innovativeness

As a result of the continuous process of developing DCs, the firms acquire and learn explicit and tacit knowledge, know-how and skills, knowledge, new processes, experience, efficient technology and innovation to improve their existing zero-level capabilities and to develop new ones:

*So there is the ability to sense those requirements and document those and convert them into the appropriate software, product package or service package (Director of Products, Sage).*

The process therefore leads to the development and renewal of the DC of innovativeness, which when applied appropriately enables firms to conduct business successfully and sustain their competitiveness in dynamic markets. Thus, the DC of innovativeness identified in this study is the ability of the firm to continuously create value through learning new ideas and initiatives in such areas as HRAs, R&D and NPD, organisational processes, structures and procedures, financial and business models, relationships with external firms and partners, suppliers, resellers, and customers, as a platform for producing current and future products and services, and to assist with development and renewal of this DC. According to the Business Development Manager, Rolls Royce:

*Clearly, the ability to monitor and control product development such that the products mature when they have to and you deliver on time as promised. That is particularly important because it can be a distraction if you have an existing problem in the business and you are unlikely to tackle that problem and renew your skills, then you will be missing out on opportunities in the future.*

This therefore involves the integration of resources to bring new products and procedures into the firm, which assist them to meet the changes and remain competitive in their business.

7.2.2 Process of Creating DC of Market Orientation

This section explains how the DC of market orientation is created using the model created in this study.
7.2.2.1 Improve and sustain competitiveness

The reasons why the two firms develop the DC of market orientation include customer demands, technological changes, and the competition within their markets. As a result, the firms develop the DC of market orientation to enable them to improve and sustain their competitiveness in these areas of their businesses. They adopt certain strategies to develop this DC.

7.2.2.2 Strategies for developing DC of market orientation

To develop the DC of market orientation, the firms adopt both planned and emergent strategies. The planned strategies are made to understand the activities appropriate and the resources required to deliver the product and services to satisfy their customers. The firms plan to develop business models for dealing with customers, and to conduct research and surveys to identify the needs and wants of their customers, and coordination of resources in the firm to develop DC of market orientation. In addition to the planned strategies, the firms also adopt emergent strategies. These strategies are derived from the generative and adaptive learning in the firms through their work to develop quality products and services for the customers, dealings with and feedback from customers and partners, and generating business intelligence. Hence the firms, through the emergent strategies, identify new ideas on new processes, products and services.

To use the emergent and planned strategies, the participating firms maintain a medium to high degree of flexibility in their structured approach, and this allows them to incorporate emergent ideas and changes in the procedures, products and services for customers. The planned and emergent strategies to develop the DC of market orientation are implemented by identifying the key resources, types of internal and external developments appropriate, and activities such as in-house innovation, HRAs, collaboration, and acquisitions.

7.2.2.3 Key resources, type of development and activities

This part of the process explains the key resources required, the developmental type and activities used by the two firms to develop the DC of market orientation.
7.2.2.3.1 **Key resources required to develop DC of market orientation**

The **tangible resources** are both financial and physical. The **financial resources** involve a variation of internal and external sources of funding. This enables the firms to invest in research, developing business and service models, networking and recruitment of skilled people to improve product and service delivery. The **physical resources** used are good infrastructure such as testing and training facilities for developing and testing products and IT for articulation of feedback from customers and generation of business intelligence.

The **intangible resources** required are human capital, structural capital and relationship capital. The firms require both general and technical skills, knowledge and high-levels of creativity for innovating business models and procedures for dealing with customers. They require structured procedures for innovating new service models for providing services to their customers and partners, and the ownership and empowerment of employees to use their initiative to deliver quality services to customers. The firms also require the commitment of senior management to provide quality products and services to the customers, and transformational leadership at all levels of the firm to ensure effective performance. The firms, most importantly, require relationship capital which gives them feedback on their products and services to assist with the development of new products and services to satisfy their customers. The tangible and intangible resources are combined with certain internal and external activities to develop the DC of market orientation.

7.2.2.3.2 **Internal and external activities for developing DC of market orientation**

The two participating firms develop DC of market orientation through internal and external developments. The **internal development** is used when the firms exploit only in-house resources, skills and capabilities, and the **external development** is used when the firms collaborate with other firms to acquire the skills and capabilities which are required. The main activities used are in-house innovation, HRAs, collaboration, and acquisition.
7.2.2.3.2.1 In-house innovation

To develop the DC of market orientation, the firms innovate structurally to develop new customer care models and procedures to deliver quality service to their customers. Through structural innovation, the firms develop effective ways of providing the best products and services to customers, and effective working relationship with suppliers and partners. The firms develop flexible and reliable customer care models such as total care packages, corporate care packages, service contracts, support contracts, and a reseller model to support their products, and offer good customer support to partners and customers. Managers in the two firms have used these models to build close relationships with and to provide maximum customer service to their customers and partners. According to the Business Development Management, Rolls Royce, and Technical Support Manager, Sage:

We offer the customer clearly full support for our existing products. We also offer a number of deals by which we do risk analysis for them, so we guarantee products in the deal (Business Development Manager, Rolls Royce).

Sage cover support gives customers access to telephone line support that is probably the primary function of that, but within the business, more seriously to access our websites and additional support documentation which is held on our website, and to download documents which tell how to carry out the process, as well as some updates of the software (Technical Support Manager, Sage).

The customer care model is a complete package of services designed to ensure that customers always have the help and advice they need to get the most out of their products. It is a long-term agreement and customers usually pay an annual subscription for the support service or, based on their financial model, they receive this service as part of the deal. The reseller model involves managers using the services of their business partners by building a group of partners who sell and set up their products. The customer care and reseller models offers a medium through which customers can get the best support for the products they purchase. It also assists with the retention of customers, feedback, good reputation, and continuous revenue for the firm.

The innovation of customer care models assists with gathering of information from customers. This feedback is communicated to other departments within the firm which assists the coordination of their resources to provide the types of products and services the customer demands. With the continuous effective communication flow and
coordination of resources, the firms develop superior services to customers. Through continuous innovation and managing of customer care models, the firms gain knowledge on the products and services and learn from them. They apply the knowledge from the customers to develop and improve their products and services. This enhances their ability to deal with the customers and coordination of resources to develop customer orientation and inter-functional coordination to develop market orientation. Innovating structurally is important for developing the DC of market orientation because it assists the firms to develop customer orientation and the right products and services to meet customer demands. For example, in Sage, the new line 50 accounting product which was launched in August, 2006, was built with inputs from more than 7000 feedbacks. A lot of those came from network events and accountants, which detailed what the customers would really like the new line 50 to do, and that was fed back into this product. This improves the customer orientation of Sage because through feedback it develops the ability to understand, innovate, and offer the customers what they want, rather than what Sage thinks they would want.

The firms also conduct certain HRAs, acquisitions, and collaborate with universities and partners to develop new business models, and procedures for meeting customer needs.

7.2.2.3.2.2 HRAs

Developing the DC of market orientation requires that the firms have human capital to develop innovative systems for dealing with customers, conducting research, and managing customer relations in the firm. The firms' HRAs therefore include recruitment, people development, and training, to gain intellectual capital in the firm. They recruit people from universities, recruitment markets, and internally in the firm. The second type of HR activity is people development, which includes the identification of potential highfliers or talent, and knowledge and career development activities. This involves the development of the employees in the entire organisation, and training employees in project management, customer service, technical support, management development programmes and on-the-job training to improve the skills of the employees to deal effectively with their customers. These training programmes are geared towards both present and future on a continuous basis in customer service and
research. To improve their skills, the employees receive both classroom-based training programmes and support from experienced employees.

HRAs assist with the development of the DC of market orientation in the firms. Recruitment brings in people from other industries or departments, and these people bring in new ideas, knowledge and expertise, different types of skills, and new procedures for dealing with customers.

The firms learn from these new procedures and working practices, which help to renew skills of employees and develop new ways of doing things. The people development and training activities in the firms help employees to understand changes in the market and prepare them with the right skills and knowledge to meet these future changes. In the words of the Director of Human Resources, Sage,

We put the right people in the right job, we give them the right skills, we continue to develop those skills, we pay them and recognise them so they don't go and work for Microsoft, and we keep them in touch with what is going on in the market.

By so doing, the firms develop the ability to sense the market and the flexibility to adapt to the changes in the market through the development of the right types of products and services to meet the changing needs of customers and markets.

7.2.2.3.2.3 Collaboration

The firms also collaborate with suppliers, manufacturers, customers and partners to develop market orientation. The type of collaborative activity used is networking, which varies from direct to third party networking. Through direct networking, the firms get customers, suppliers and partners to understand their products and services, and to gather information on their products and services. For example Sage differentiates itself by getting closer to the customers:

We aim to differentiate ourselves from our competition by building closer relationships with our customers and improving the case of using our products and services. We believe that we offer outstanding customer service and our approach is designed to engender customer loyalty. Support service is an essential component of our product offering and is critical to developing an enduring relationship with our customers. It allows our customers to benefit fully from their software solutions as well as giving us direct insight into market and product developments (Sage, Annual Report 2006).
They employ different long-term schemes such as service contracts, total care packages, social events, research, and direct interactions with customers and partners. According to the Product Manager, Sage, and the Vice-President Corporate Venturing, Rolls Royce:

*We have a very strong relationship with our customers, and we put customer service very highly on our agenda. It is something that we measure and try to improve more on a constant basis (Product Manager, Sage).*

*It is about getting close to your customers, so airline people will talk to our people in civil airlines. So pretty much most of the airlines around the world are our customers in some form, and as a result of that, we need to maintain a close relationship to understand what it is that they require, but also to make sure that they understand the availability of our latest services, new technologies, and new systems (Vice-President Corporate Venturing, Rolls Royce).*

The firms invest in creating and developing new customer care models to enhance the services that they provide for their customers. So, they invest both their money and time to create the DC of market orientation:

*So we invest a lot of money and time in finding out exactly what our customers want so that we deliver exactly what they want, rather than what we think they want. So we spend a lot of resource time and money on the research side (Business Development Manager- Marketing, Sage).*

The firms provide their customers with the kind of products and services that the customers want rather than developing those that they think the customers want. To achieve this, the firms put a lot of money and time into research to determine the type of products and services their customers would like. They also engage customers in direct interactions either through telephone interviews or panel discussions on products and services. Further, they use social events in a very relaxed environment to gain information from customers and business partners. Due to the atmosphere, customers and business partners share their problems with managers rather than in an office environment. The Business Development Manager Rolls Royce and the Director of Investor Relations, Sage, note this:

*I think probably the biggest thing is an understanding of what it is that makes your products, and by products I also mean services and value. Understanding of your products comes with things like being closer to the customer and to your market to be able to react and predict change. That is one of the important*
things and certainly a vision of where you will be (Business Development Manager, Rolls Royce).

And what that relationship does is it means the customer tells us all sorts of things about what they need, what is going on with the given software, and what they will like in the next version of the software. That is crucial (Director of Investor Relations, Sage).

As a result of the direct networking, firms gain both positive and negative feedback on areas of their products and services, and information on what customers would like to see. This information is communicated to the different departments in the firms. Through their coordinated efforts and resources, the firms apply the information gained to add value to their products and services for their customers.

The firms also use third party networking which involves gathering intelligence from the wider world through attending UK and international conferences where managers of the firms interact with competitors, partners and customers to gain knowledge of current issues in their business. Third party networking is beneficial for developing and renewing the DC of market orientation because the firms obtain good intelligence and knowledge of their customers and competitors, which enhances their ability to understand and predict the markets in which they operate. The firms also conduct business intelligence to assess their competitive position relative to that of their competitors, especially their strategic competitors. By getting closer to stakeholders, the firms receive feedback on their products and services. The feedback is communicated to the different departments of the firms. Through their coordinated efforts, the feedback is built into developing new products and adding value to the services. The Director of Products, Sage, confirms that:

We have conversations with customers or end users, people who know the industry and partners for feedback, and we translate that into particular features in the product. So, there is the ability to sense those requirements and document them, and convert them into the appropriate software, product or service package. So, for example, early this year we launched our first HR support service which is web-based so it is not a product that you need to store on your PC, which will help businesses run themselves better. From the feedback, we worked out that was a niche in the market, an area in the market where our customers needed a pressing solution. So that was then fed into the software capability to develop that software, release it on time, and in a form that customers can use.
As a result of the new, improved and enhanced services and products, customers are happy, because they get products and services they want, which leads to purchases and a revenue stream for the firm. The firm retains its existing customers because it listens and provides their needs. Therefore, the firms are able to keep up with competitors because they continuously seek information on what is going on in their operating environment, and therefore develop the DC of market orientation to sustain their competitiveness. With the continuous process of direct and third party networking, the firm develops customer orientation, competitor orientation, and inter-functional coordination to deal effectively with customers and keep a constant eye on the market.

7.2.3.4 Acquisitions

Acquisitions bring capabilities, skills, new customers and business models for dealing with customers. The firms integrate the new capabilities, skills, new customers and customer care models for dealing with customers into their operation through learning. The firms apply them to interact and build long-term relationships with customers, which enable them to improve their ability to identify and meet their customers’ needs and demands. The firms also gain new customers who give them feedback on their products and services, which assist with new development and improvement. Acquisition assists to develop market orientation, because the acquiring firms gain knowledge, skills, and experience for providing quality services to customers, which leads to changes in the procedures for dealing with customers. Through continuous acquisitions of other firms, the studied firms learn from these acquisitions to develop the DC of market orientation.

For example, Sage learnt from the best practices of two acquisitions they made to develop the premium support contract, which is now used in all their companies. Sage made two acquisitions, Ciel in France (1992) and Peachtree in the US (1999). Both of these acquisitions were entry-level players which meant that they were half way through the bottom end, which is the $200 or less, end of the market. The two acquisitions took on the customers they already had and developed a customer care package called tiers of support. So a customer can start with a basic phone support, and then get a better support where they can obtain some more advice and some proactive outbound calls, as well as being able to call in. Both companies gradually built up these menus which gave rise to thinking at the more strategic level, where the rest of the
group realised it was a good package. So the rest adopted that idea and now Sage has a worldwide focus on what they call premium support. The rest of the group learnt from the success of Ciel and Peachtree, which turned out to be a strategic driver, especially in the market that is a bit more mature nowadays, where you get less new volume of market and need to make more from the customers you have.

7.2.2.3.3 Learning

The firms learn from the knowledge, skills, new procedures, experience and the already established customer base to develop market orientation. They use structured methods such as formalised and non-formalised systems to capture and utilise the knowledge. Learning from the knowledge and the experience created from the internal and external activities helps them to develop the ability to tap the full potential of their knowledge, skills and experience, and this is achieved through knowledge capture. Two different types of knowledge are captured: the experience and skills of people, which are tacit, and customer feedback and procedures for dealing with customers, which are explicit. Knowledge, experience and skills for developing the DC of market orientation are captured through working with recognised industry experts, non-competitors, dealing with after-market, and lessons learnt on projects to identify and document their procedures, customer feedback, and best practices. The knowledge is articulated through capability intranet, training programmes, and establishing communities of practice (CoP) (see section 6.9).

Learning is very important in developing and renewing the DC of market orientation, because it is the medium through which the skills, experience and feedback are shared and used to develop and renew procedures, products, and services, and customer care models for dealing with customers. The Vice-President Marketing, Rolls Royce, gave an example of how they learnt from networking to develop a structural innovation to deal with their customers. Rolls Royce wanted to provide a 24-hour, 7 days a week (24/7) support service to its customers with a higher level of IQ for providing information on products than just a call centre answering calls. To do this, they networked with companies such as Dell, Amazon and experts in logistics in call centre management which provided genuine 24/7 support services. They spoke to Dell about how it handles specifically mail order because of distance from its customers, and a lot of Rolls Royce after-market sales is also distant, so it wanted to know how Dell
manages that interface and how it keeps the flow of information. Rolls Royce also
spoke to Amazon about despatching and to experts in telephone call centre type of work
specifically on how to respond to customers and keep the link with customers, even
though they are not with them. Rolls Royce learnt from the experience and knowledge
of these companies, and improved on it by deciding on the sort of things to incorporate
in developing support services model to meet the requirements of customers. This has
improved its market orientation, specifically customer orientation, of putting the
customers first and developing the necessary products and services to satisfy them.
Since this development, services have been growing constantly for the past six years
and now account for 53% of revenue.

Learning provides knowledge about competitors, customers and partners, and creates a
common understanding of the operations, and procedures of the firms. The firms learn
from the skills, knowledge and feedback to provide the products and services their
customers want. As a result of the continuous capturing and utilising of the knowledge
created from the internal and external activities, the firms are equipped with current
information, knowledge and skills they need to adapt to the changing dynamic
environment and demands of their customers. The firms therefore develop the ability to
deal effectively with customers and keep a constant eye on the market and develop and
renew the DC of market orientation.

7.2.2.3.4 Outcome of process: market orientation

Market orientation consists of three components: customer orientation, inter-functional
coordination, and competitor orientation (see section 6.10.2). Customer orientation in
this study is developed through the continuous creation and managing of close customer
and partner relationships in the firm. The Development Manager Payroll, Sage confirms
this:

So we have customers, accountants, business partners and now we are much
more aligned with needs of each of these customers. So we have developed the
capability of being more in tune with different customer communities and their
different requirements (Business Development Manager Payroll, Sage).

This is the ability of firms to develop close relationships with customers and partners
through communication, continuous exchange of information about the needs and
emerging requirements of customers, development of business models, and joint
problem solving through successful collaborative relationships. Competitor orientation is developed in the firms through generating information about competitors through business intelligence, benchmarking, networking with partners and suppliers, and assessing the firm's current developments in relation to competitors (Kohli and Jaworski, 1990). The firms use the information to create knowledge, flexibility and speed to adapt to changes that occur in their operating environment quickly, and to take advantage of some opportunity that occurs in that environment. Further, inter-functional coordination is developed with the integration and coordinated efforts of the different business units, departments, matrix organisational structure, various business models, and project teams. The firms are able to coordinate their resources towards delivering superior value for the customers through the development of this DC.

7.3 DISCUSSION OF DEVELOPED THEORY IN RELATION TO LITERATURE ON PROCESS OF CREATING DCS AT STRATEGIC LEVEL

The substantive theory developed in this study explicates the process of creating DCs and extends the conceptual theories on the process through empirical findings. From the literature review in Chapter 2, most of the theories on DC creation at the strategic level are conceptual (e.g. Teece et al., 1997; Eisenhardt and Martin, 2000; Zollo and Winter, 2002, 2003; Zahra et al., 2006). The analysis and integration of the theory, categories and concepts in extant literature revealed that the theory in this study shares some similarities and differences with research work on DCs. Although there is evidence of some similarities in both conceptual and empirical studies, this substantive theory differs considerably from these. In the rest of this section, the researcher provides a critique of the theory developed in this study in relation to extant literature.

Teece et al. (1997) proposed a framework of how firms can achieve and sustain competitiveness in rapidly changing technological environments. They identified that DCs are created through organisational processes (integration and coordination, learning, and reconfiguration processes), positions and path dependencies. In the Teece et al. (1997) model, the integration and coordination process involves both internal and external activities for developing DCs.
Internally, the developmental activities Teece et al. (1997) identified were innovation and strategic decision-making. The external development activities were alliances, buyer-supplier relations, and technology collaboration. They also identified that DCs are developed through a reconfiguration process. This involves monitoring how firms learn and develop the ability to reconfigure their asset structure to accomplish the necessary internal and external transformations in rapidly changing market environments. According to them, an effective reconfiguration process depends on certain factors such as locally autonomous firm processes, ability to scan the environment, ability to evaluate markets and competitors, and the ability to quickly accomplish reconfiguration and transformation ahead of competitors. They also identified that the asset position (financial, structural and human capital) of the firm plays a role in the creation of DCs. Further, they identified learning as an important aspect in the process of creating DCs.

From the above, the Teece et al. (1997) framework shares similar findings with the present developed theory: internal and external developments and activities, key resources for developing DCs, and learning. However, their framework focuses on the whole concept of DCs and not only on the process of creating DCs. They thus identified the various activities of developing DCs without however examining and explaining in detail how each of these activities is integrated with resources and learning to develop DCs. This is the reason why Teece et al. (1997) stated that they had merely sketched the framework of DCs, which required both conceptual and empirical studies to expand the theory. The theory presented in this study has expanded the process of creating DCs empirically through the examination and explanation of the various components of this process. Further, the theory in this study has identified and explained strategies for developing DCs, but Teece et al. did not examine the types of strategies used to develop them. Furthermore, human resource activities (HRAs) were identified and examined as an important part of the process in this study, but they did not examine HRAs as part of creating DCs.

In their framework, Teece et al. (1997) stated that the development of DCs is also shaped by path dependency of a firm. However, the findings from this study revealed that although the history of the firm's strategy is important, it does not shape the development of DCs. This is because the changes in the external environment dictate
the types of DCs that have to be developed. Hence, if the path dependency of the firms shapes the development of DCs, then it would be based on past actions which will not correspond to the requirements of the present changes in their markets. For example, the Product Manager, Sage, noted that:

*The development of DCs has a great deal to do with making sure that our products are still relevant in the market place under the changes with the needs of the business. For example the needs of businesses twenty years ago are completely different to what business look for now, the Internet was not around then, we did not have online trading, we did not have business-to-business, and these kinds of things are all new innovations. So it is important that with whatever software we are making, we take into account all the changing aspects of market and that is how we have managed to sustain our capabilities.*

Hence, the development of DCs in the firm is shaped by the current demands of the markets in which it operates. Therefore, the changes in the external environment shape the development of the appropriate DCs to respond to environmental changes.

The role of learning in the process of creating DCs identified in this study differs from the role of learning in that of Teece et al. (1997). According to them, DCs only occur through learning, and all the activities are based on learning. However, the findings from this study demonstrate that although learning is a fundamental part in the process of creating DCs, it is an intervening mechanism through which the activities conducted by the firms actually lead to the development of DCs. The present theory illustrates that to develop DCs, firms have to conduct activities such as in-house innovation, HRAs, collaboration, and acquisition to gain knowledge and experience before they can learn from them. The underlying factors for these activities are different from those for learning in the firm. For example, for HRAs, the firms need people processes (procedures for recruiting, training, rewarding and developing people) and money. Clearly recruitment is not a learning activity; it is purely an HR activity. The firms learn from the knowledge and experience from these activities and apply them to the operations of the firm to develop DCs. This study identified the various types and tools of learning used, but Teece et al. (1997) did not explain them in detail.

Finally, the framework developed by Teece et al. (1997) is a conceptual theory and is not grounded in empirical data. The framework does not actually show a coherent process through which the strategic level process of creating DCs is conducted. In contrast, this study has developed an empirical theory on such a strategic level process.
Since the development of the Teece et al. (1997) framework of the DC concept, there has been further expansion by other scholars such as Eisenhardt and Martin (2000), Zollo and Winter (2002), and Zahra et al. (2006); however, these theories are all conceptual.

Eisenhardt and Martin (2000) argued that the creation of DCs is guided by well-known learning mechanisms: gaining and releasing resources, resource integration, and resource reconfiguration. From the literature reviewed in Chapter 2, they identified that resource integration for developing DCs involves both internal and external developments: product development, alliances, strategic decision-making, acquisitions and project teams. Resource reconfiguration for developing DCs is done through constant surveillance, intelligence gathering, and learning. This is similar to the findings of this present study in the following areas: conducting constant surveillance to identify the causal factors for creating DCs, using internal and external activities, and learning to develop DCs.

Although the internal activities identified by Eisenhardt and Martin (2000) are similar to those of the present theory, there are some differences between the two. They maintain that DCs are specific processes which have rich empirical research bases. They state that the following activities: product development, alliances, strategic decision-making, acquisitions, and project teams, are DCs. In contrast, this substantive theory developed from the grounded data describes and examines the features of the process of creating DCs. It identifies these internal and external activities: in-house innovation, HRA, acquisitions and collaboration as the means by which the DCs of innovativeness, market orientation, and ability to manage human resource, knowledge, collaboration, and acquisitions are developed. So, the activities such as alliances, acquisitions, and product development in this theory are not DCs but the means by which DCs are developed and renewed.

Further, from the findings in this study, DCs are not processes as suggested by Eisenhardt and Martin (2000) but rather the abilities of firms to develop and transform the processes and static organisational capabilities in the firms to achieve change. Furthermore, their framework is conceptual. Although they referred to rich empirical research on DCs in their paper, these empirical bases were taken from different
disciplines and focused on the individual functional areas of firms, and thus their framework is not a coherent empirical strategic level process of developing DCs.

Zollo and Winter (2002) also developed a model of how DCs evolve in firms. They attributed the development of DCs to collective deliberate learning. In their model, they consider DCs as a firm’s structured and persistent routine learning activities that shape its development. They identified three learning activities (knowledge creation, capture, and articulation) that lead to the DC development. This is similar to the findings in this study on learning activities for developing DCs. Further, the Zollo and Winter (2002) findings on types of knowledge support the findings in this study that DCs are created through both tacit and explicit knowledge. They maintain that tacit knowledge which is embedded in the firm has more leverage to maintain competitiveness because it cannot easily be imitated.

Although the present theory shares similar findings with the Zollo and Winter (2002) model, the process of creating DCs is not achieved through only organisational learning. The present study identified that the process of developing DCs at the strategic level involves certain developmental decisions, strategies, resources, and activities, and learning is only one aspect of the whole process. The research uncovered that learning acts as a mechanism or link between the activities, and not the actual development of DCs. The Business Development Manager, Rolls Royce, gave an example of how Rolls Royce learnt to develop DCs:

Rolls Royce was thinking about moving into a new area of technology sector, where the automotive sector was already in things like electrical systems. They actively made decisions to recruit people and also in areas like manufacturing, where Rolls Royce recognises that some of the processes in manufacturing that the automotive industry has is more mature than what the aerospace industry has. So here again, it made decisions to actively go and recruit people in those areas to bring in change. So clearly the electrical system and manufacturing nowadays are key examples that point to Rolls Royce recognising that it could learn from the other industries and the best way to do that is to recruit people in.

Hence, to develop DCs, Rolls Royce first recruited the people with the right skills and knowledge, and then learnt from these skills and applied them to improve its capabilities. Hence, learning acted as link between recruiting the people and deriving the skills to develop the DCs the firm requires.
Zahra et al. (2006) developed a broad conceptual model of the various activities associated with the development of DCs. According to them, entrepreneurial activities, dedicated leveraged resources, skills, and organisational learning and behaviour processes are the central activities for developing DCs. They stated that firm entrepreneurial activities focus on the identification and exploitation of opportunities, which influence the selection of resources and skills and promote organisational learning processes to capture external knowledge as new situations arise. These choices then combine to create new substantive capabilities\(^\text{15}\) and broaden the organisational knowledge\(^\text{16}\) base. Together, organisational knowledge and substantive capabilities determine which types of DCs are necessary to adapt to emerging conditions. Their model implies that entrepreneurial processes shape the recombination of substantive capabilities, and over time, increase the 'strategic variety'\(^\text{17}\).

The Zahra et al. (2006) theory shares some similarities with the theory developed in this study. First, they stated that the development of DCs is triggered by certain changes (e.g. the entrepreneurial firm’s inability to keep up with competition and rate of change or volatility in market) in the external and the internal context of firms which prompts them to change. Also, they maintain that lack of success with current substantive capabilities increases the development of DCs. There are, however, differences between some of the changes identified by Zahra et al. (2006) and the present study. Their model focused on entrepreneurs, and because these are new ventures the firms have difficulty to keep up with competition and the rate of change or volatility in the operating markets. In contrast, this study focused on established firms. These firms develop DCs to improve and sustain competitiveness, and not because they are unable to keep up with competition and changing market conditions.

Zahra et al. (2006) also identified integration and coordination of resources as part of the process to develop DCs. This involves the decision on the types of capabilities to be developed, strategies to be adopted, developmental types, activities to use, and how these skills will be integrated to develop DCs, which is similar to the present theory. Although they identified the strategies and integration, and coordination activities, they

\(^{15}\) Substantive capabilities are a set of things that a firm can do (skills) (Zahra et al., 2006).

\(^{16}\) Organisational knowledge is all that is known or understood by the organisation and its members (Zahra et al., 2006: 926)

\(^{17}\) Strategic variety is the ability of the firm to conceive and implement varied, multiple, and innovative strategic responses to challenges it faces in its environment (Zahra et al., 2006: 926).
did not explain in detail the type of strategies, developmental approaches, activities, and how these are combined to develop DCs.

Further, they identified learning as a means to develop DCs. They listed and explained the types of learning undertaken as: improvisation\(^\text{18}\), trial and error\(^\text{19}\) and experimentation\(^\text{20}\). The learning activities listed share similarities with how the participating firms in this study learn generatively and adaptively. They maintain that DCs are created through organisational learning and behaviour. However, this study identified learning as a mechanism or a link to develop DCs and not an activity on its own that can develop DCs. On the issue of learning, Zahra et al. (2006) differentiated between how organisational learning is conducted to develop DCs in new and established firms. However, this present study explored learning only in established firms. Furthermore, their model shows that there is a cost implication when developing DCs. This is similar to the findings of the present study; however, cost in the present study constitutes one of the factors for selecting a particular developmental type for creating DCs, which was not identified in the Zahra et al. (2006) model. Finally, unlike the present study which is empirically based, their model of creating DCs is conceptual.

In Chapter 2 of this thesis, the empirical literature reviewed provided some support in sensitising the grounded data. However, most of the existing research concentrated on either one or two functions of the firm (Rindova and Taylor, 2002; Montealegre, 2002; Salvato, 2003, Costanzo, 2004; Ethiraj et al., 2005; Menguc and Auh, 2006). For example, Rindova and Taylor’s (2002) findings share certain similarities with some of the components of this present theory, especially the role that human capital and the HRAs play in the development of DCs. They also highlighted that the development is triggered by certain external and internal factors. Again, they identified certain activities such as recruitment, organisational and structural innovation, acquisitions, and resources to develop DCs. However, their research was limited in identifying all aspects of HRAs for developing DCs. This is because they concentrated on the recruitment of top management and specialists to augment their skills, which limited their

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\(^{18}\) Improvisation involves real-time, unplanned experience in which action informs design as it occurs (Zahra et al., 2006: 932).

\(^{19}\) Trial and error learning involves the taking of actions, planned or unplanned, to inform future action (Zahra et al., 2006: 932).

\(^{20}\) Experimentation is the deliberate and systematic use of varied conditions to learn cause-effect relationships (Zahra et al., 2006: 932).
identification in detail of the capabilities of middle management and other teams, and their inputs in evolving DCs. They did not identify and explain other HRAs such as career development and training as activities for developing DCs. The present theory explored how top and middle management, specialists and generalists are recruited, developed and trained to assist with the creation of DCs. Further, their study did not explain the types of market changes which challenge firms to develop DCs. Their theory is not a coherent integrated theory of how DCs are created at the strategic level.

Ethiraj et al. (2005) similarly developed a theory of creating capabilities; however, they focused on one specific functional area (project management) and concentrated on the creation of first-order capabilities (zero-level capabilities). They suggested in their study that improvements in management capability promise to yield higher marginal improvement in the project contribution performance, therefore confirming the importance of renewing capabilities in enabling firms to perform. The present study did not focus on the creation of first-order capabilities (zero-level) per se to generate rent. Rather, it focused on higher-level capabilities (DCs), which refers to capabilities to create and transform the first-order capabilities (Jantunen, 2002). The model developed in this study is not a functional process of creating DCs, rather a coherent theory encompassing the entire strategic level process of creating DCs. Therefore, the single functional empirical studies are not consistent with the present strategic level theory of the process of creating DCs.

The assumption that firms create DCs based on one function and the same function can be used to create all other capabilities is not adequate. For example, Dougherty et al. (2004: 34) stated that “We focused on just one DC, and do not think that the same structuring underpins all capabilities”. Further, to achieve and sustain competitiveness, firms require different DCs; not only one, but a bundle of DCs that together drive the firm to achieve competitiveness. From the findings, the most important factors to develop DCs are the ability of the firm to recognise new opportunities to create new capabilities, renew existing ones, and allocate resources between different capabilities. Thus, the theory proposed examines and explains all the various strategies, resources and activities that together lead to the development of DCs in the firm.

It must be emphasised that although the conceptual and empirical research provide some similarities with the present theory, the explication of DCs as a scientific theory
still remains sketchy and insufficiently covered in empirical research. Hence, this present study has extended the theoretical and empirical status of the DC concept, specifically on the process of how DCs are created at the strategic level. The findings from this study illustrate that the process of creating DCs in dynamic markets is a series of iterative or simultaneous actions in a process which involves constant surveillance of the internal, operating and remote environments in which firms operate. Firms then adopt both planned and emergent strategies to respond to changes in these environments, and the selection of either internal or external development approaches or both to create DCs. They adopt different types, degrees and amounts of activities and resources to develop DCs. The combination of the key resources, developmental activities and learning as an intervening mechanism lead to the development and renewal of their DCs.

The theory posits that all forms of in-house innovation, HRAs, collaboration, acquisitions, and learning are important for developing DCs and should be considered during the process of developing DCs. For example, some intangible resources such as tacit knowledge that enable firms to achieve various goals in the market are not easily tradable and even if they can be purchased in strategic factor markets, the cost of acquiring these assets uses the profits made. According to Teece et al. (1997), these are firm-specific assets that must be built, they cannot be bought. However, if other firms discover and are able to copy or replicate the tacit knowledge of routines, then that capability loses its value to achieve competitiveness. Also, the effectiveness of the DC concept in sustaining competitiveness depends on the effective manipulation of knowledge resources (Eisenhardt and Martin, 2000). Since these are firm-specific assets that must be built and cannot be purchased, it is important that firms develop DCs to understand the process through which these tacit assets could be generated or how they have been generated over the years.

The theory also reveals that development and renewal of DCs focuses on three key areas of the firm: technology, people and processes. The Chief Executive Officer, Rolls Royce, noted this:

*We continue to invest in technologies, products, people and capabilities with the objective of broadening and strengthening our product portfolio and improving efficiency.*
It is important to develop DCs to impact on these three areas because: (1) it is people who develop and use the technology, and (2) the processes and technology depend on the people to be effective. So, to attain the potential maximum benefits of DCs to achieve and sustain competitiveness, firms must have a balanced approach of resource allocation towards the different types of activities employed to develop DCs to impact on these areas. The next section discusses the various components of the theory developed in this study in the context of extant literature.

7.4 DISCUSSION OF THEORY COMPONENTS AND EXTANT LITERATURE

This section explains and critiques the main concepts, categories and sub-categories of the theory in relation to extant literature. The main concepts and categories identified from the analysed data were planned and emergent strategies, resources, internal and external development, in-house innovation, human resource activities, collaboration, acquisitions, and learning.

7.4.1 Planned and Emergent Strategies

The data suggest that strategies for developing DCs are planned and emergent. A planned strategy is an intended course of action which stipulates measures a firm proposes to take and details of actions that will be undertaken to reach a particular objective (Mintzberg and Quinn, 1996; De Wit and Meyer, 2004). A planned strategy therefore involves deliberate decisions made to achieve a firm's goal. On the other hand, emergent strategies come into being during a process when people divert from their intended course of action to do additional things, but their behaviour is still strategic (Mintzberg and Quinn, 1996; De Wit and Meyer, 2004). When using emergent strategies, managers do not have prior intentions of what has to be done but they can explore, learn and piece together a consistent set of behaviours over time (Mintzberg, 1978; De Wit and Meyer, 2004).

There is an extensive literature that discusses planned and emergent strategy formulations. Developments in the field are characterised by two main arguments of how strategy is formulated. The ongoing controversy is between the rational decision-making frameworks (Chandler, 1962; Sloan, 1963; Ansoff, 1965; Andrews, 1971;
Porter, 1980) and the emergent frameworks (Allison, 1971; Mintzberg, 1978,1994; Quinn, 1980; Mintzberg and Waters, 1985). The rational decision-making approach considers strategy formulation as a series of prescriptive techniques which can be applied to obtain a fit between a firm’s resources, distinctive capabilities and its environmental opportunities. The strategic processes in firms are associated with rational decision-making frameworks, which involve deliberate, analytical and systematic rational choice in the decision-making process of planning and intent (Ansoff, 1965). The rational strategists see strategy as coherent patterns of decisions and actions (Chakravarthy et al., 2003).

There is a growing theoretical and empirical underpinning to emergent strategy, and this is manifested in the works of Pettigrew (1985) who adopts a useful approach relating to the context, process and content of strategic decisions. Further, research on strategy formulation, such as the works of Mintzberg (1994) and Mintzberg and Quinn (1998), has come out with a different framework to strategising, which differs from the rational formulation. Whittington (2003), for example, advocated a ‘practice perspective’ which focuses on the practical business of strategising, but with particular reference to the ‘formal work of strategic and firm design’.

The emergent approach to strategy considers both the formal components (situational factors in context) and the informal components (political factors over time) relating to the processes involved in strategy formulation. Emergent strategists explain the strategy-making process as the outcome of social, political and cultural processes of firms and external constraints (Hannan and Freeman, 1984; Pettigrew, 1985; Johnson, 1987). There are a variety of explanations and theories on the process of developing strategy in firms with the emergent approach (Fredickson, 1984; Eisenhardt and Zabaracki, 1992). The emergent approach to strategising emerges from local understandings, recipes and routines, and hence not from a rational calculation (Mintzberg (1987, 1994).

Whilst there is an extensive literature (Chandler, 1962; Sloan, 1963; Ansoff, 1965; Allison, 1971; Andrews, 1971; Mintzberg, 1978, 1994; Porter, 1980; Quinn, 1980; Mintzberg and Waters, 1985; Mintzberg and Quinn, 1996) on the subject of planned and emergent strategies, it has not been specifically related to the process of creating DCs. A few studies have identified planned and emergent strategies for developing
capabilities, but do not explain in detail how the two strategies are used. For example, Volberda and Baden Fuller (1998) in their conceptual study proposed four means for strategic renewal and capability building: selection, hierarchy (internal), time and networking (external).

According to them, strategic renewal and capability building using this categorisation could be passive or active. Selection implies the passive market forces that weed out relatively less effective firms are a passive way of renewal and competence building. In contrast, hierarchy, time and networking are considered active means of acquiring capabilities and strategic renewals. With the active means, options are available to managers, and they can afford to make deliberate efforts of selecting the options that give them the highest leverage. Their suggestion supports this theory that DCs can be developed and renewed through planned and emergent strategies. Although it is not explicitly stated, Volberda and Baden Fuller (1998) suggest that capability development can be either planned (active) or emergent (passive). This study has extended their suggestions by empirically identifying that DC development is both planned and emergent.

Andersson and Kaplan (2004), in their study of DCs and means of capability acquisition, identified that capabilities are created through deliberate planning and emergent strategies. This evidence therefore supports the findings of this study on DCs. However, this study extends the literature further by identifying and explaining that the strategies for creating DCs in firms is a mixture of planned and emergent strategies. For example, when asked about the types of strategies employed to develop DCs, the Manager, Mergers and Acquisitions, Sage, stated that "There are some that are planned but also there are elements that are a reaction to the market as well, and those are the ones that emerge". Hence, the strategy used to develop and renew DCs is a hybrid of planned and emergent strategies. The literature on the process of creating DCs has not explored in detail the hybrid approach. The present study identified and explained the types of strategies that are used, which the reviewed literature has so far not indicated. Hence, this finding is a significant contribution to the DC and strategy literature.
7.4.2 Resources

Resources were identified as an important aspect of developing and renewing DCs. In order that the internal and external development efforts could be successful in creating DCs, the firms require certain key resources. Resources can be defined as stocks of knowledge, financial assets, physical assets, human capital, and other tangible and intangible factors that a business owns or controls (Grant, 1991; Amit and Schoemaker, 1993; Capron et al., 1998). Resources are inputs into a firm’s production process, such as capital, equipment, and the skills of individuals, employees, patents, finance, and talented managers. Resources are either tangible or intangible in nature. With increasing effectiveness, the set of resources available to the firm tends to become larger and through the synergistic combination and integration of these sets of resources, competitiveness is developed (Barney, 1991). Examples of firm resources are the assets, firm attributes, information, knowledge, brand names, relationship capital, human capital, trade contacts, machinery, and capital controlled by the firm (Wernerfelt, 1984).

There is a vast body of literature about the relationship between firm performance and its resources (e.g. Barney, 1991; Teece et al., 1997; Montealegre, 2002; King and Tucci, 2002; Verona and Ravasai, 2003). Teece et al. (1997) emphasised the importance of intangible assets in developing DCs. Montealegre (2002) examined how capabilities are developed in support of a firm’s strategy. Montealegre’s (2002) findings reveal that capability development in support of a new strategy is a gradual process that is cumulative, expansive, and very dependent on the way that difficult-to-imitate resources (intangible resources) and actions are combined. Similarly, King and Tucci (2002) examined the role of experience and managerial choice in the creation of DCs. They recognised that the experience of managers (human capital) assist in determining firm dynamics and the development of DCs.

The findings from this current study suggest that developing DCs requires certain key resources and these are both tangible and intangible. The tangible resources identified in this study were financial and physical assets and the intangible resources ranged from human capital, structural capital to relationship capital. Even though both tangible and intangible resources are important for developing and renewing DCs, the types of resources necessary and how they were used to develop DCs were not sufficiently developed in literature. For example, Deeds et al. (2002) established that the
Development of a new product is a function of choice of geographic location, scientific team, and leadership that has the knowledge and experience in new product management. Their findings are similar to the developed theory; however, the choice of geographic location was not identified as a resource to develop DCs in the present study. Further, the type of resources and the role these resources play in the development process of DCs were not adequately explained. This study has identified the types of resources and explained the role of resources in the development process of DCs. For example, financial resources, human capital, relationship capital and structural capital are imperative to the process of developing and renewing DCs. Without financial resources the firms cannot undertake certain activities such as acquisitions, recruitment and innovation to develop DCs. This was made evident when the managers from the two firms stated that both tangible and intangible resources play significant roles in the process of creating DCs.

Intangible resources were identified as a direct source of developing DCs to gain competitiveness because they are tacit, complex and firm-specific. This is similar to findings in the DC literature. For example, Teece et al. (1997) and Eisenhardt and Martin (2000) portray intangible resources as the resources that have higher leverage for developing DCs. Further studies have stressed the importance of intangible resources, such as knowledge and scientific capabilities, to achieve competitiveness (Kogut and Zander, 1992; Peteraf, 1993; Henderson and Cockburn, 1994). The resources highlighted by these researchers are tacit, complex and firm-specific, which makes them highly inimitable for competitors (Reed and De Fillipi, 1990).

7.4.3 Internal and External Development Approaches

From the data, internal and external developments were identified as the two major categories through which the participating firms develop and renew their DCs. The internal approach refers to the development of DCs solely from internal resources and activities. From the analysed data, the following activities were identified as constituting the internal development approach: (1) In-house innovation, and (2) Human resource activities. It must be noted that developing DCs internally is difficult (Henderson and Cockburn, 1994) due to causal ambiguity, and it can be very costly.
External developments for creating DCs refer to the process of developing DCs through external sources, which involves the formation of external relationships, interactions with other firms and acquisition of firms. The activities associated with this type of DC development were identified in the data as: (1) Collaboration with other firms, and (2) Acquisition of firms.

There is extant literature that describes the patterns of capability acquisition as internal and external and has linked the two development approaches to the creation of capabilities and DCs (Williamson, 1991; Volberda, 1996; Christensen, 1997; Teece et al., 1997; Mitchell and Nagarajan, 1998; Volberda and Baden Fuller, 1998; Whitley, 2002; Andersson and Kaplan, 2004; Deeds et al., 2004). For example, Mitchell and Nagarajan (1998), discussing the methods of acquiring know-how when there are technological changes, argue that firms use internal R&D or form external relationships to develop DCs. External relationships includes equity-based associations such as JVs, direct investment, and non-equity associations such as technology licensing, technology exchange, testing agreements, and research contracts. Similarly, Andersson and Kaplan (2004) identified that DCs are acquired through internal and external activities. Internally, the firms acquire capabilities through in-house innovation and cloning, and externally, through collaboration and firm purchasing. They emphasised the importance of both development approaches for the creation of DCs.

However, most of these studies did not examine in detail the activities that are applicable to each of the two development approaches. For example, the Mitchell and Nagararan (1998) findings support the present findings on the two development approaches; however, their internal approach is only limited to R&D (business scope innovation) and not the other types of innovation identified in this study: structural and organisational. The external activities identified by Mitchell and Nagaragon (1998) which are the formation of equity and non-equity associations to develop DCs are consistent with the present theory; however, they did not examine acquisition of firms as an external activity for developing DCs. In contrast, acquisition of firms was identified as one of the activities for developing DCs in this study. This present study fills this gap by looking at the entire firm internal and external activities for developing DCs.
Similarly, the findings from Andersson and Kaplan (2004) support the findings from this study on the internal and external development approaches for creating DCs. However, the internal activities they identified were in-house innovation and cloning. Cloning was not identified per se in the present study, rather the firms benchmarked and gathered intelligence to assess what goes on in their industry, which assists them in bringing new business, organisational and structural innovation into the market, rather than cloning a competitor’s innovation. HRAs and learning as an intervening mechanism were identified as important for creating DCs, but these were not addressed in the Andersson and Kaplan (2004) study.

Whilst the extant literature shows that developing DCs occurs through internal and external developments, the types, nature, form and variations of these developmental activities were not elaborated. In this study, the two firms confirmed that they employed both internal and external development approaches for creating DCs. The specific rationales, types, nature, form and variations of these activities were identified and explained to ensure that the theory can be replicated and tested. Developing DCs is a combination of resources and activities, and hence managers can only use a certain type of development approach depending on the resources available to them. The internal development approach is a long-term process to develop DCs, whereas the external approach brings in skills and capabilities to improve DCs in the short-term. Therefore, the choice of a particular type of developmental approach depends on the need for those capabilities, the availability of the capabilities, the resources available, and the opportunity cost of selecting an internal or external development approach over the other. It must be noted that similar types of DCs can be developed from both internal and external sources. Hence, the two development approaches complement each other or can act as substitutes.

Further, the findings from this study also demonstrated that although some of the DC literature emphasised the importance of the internal sources of development over the external sources (Teece et al., 1997), this study suggest that both are equally important in developing DCs (Andersson and Kaplan, 2004). Again, there were areas, especially the HRAs within the internal development approach, which were not considered by most of the studies in the literature but have been identified in this study as important for developing DCs at the strategic level.
7.4.4 In-house Innovation

From the data analysed, innovation was identified as one of the highly patterned activities through which DCs are developed and renewed in the two firms. It must be noted that whilst the concept of innovation was abstracted from the data, this is not the first time that the concept has been used for developing DCs. Much research work has been reported on innovation in relation to the development of DCs (Clark and Fujimoto, 1991; Eisendhart and Martin, 2000; Deeds et al., 2002; Tushman and O'Reilly, 2002; Verona and Ravasi, 2003; Daniel and Wilson, 2003; Marsh and Stock, 2003; Dougherty et al., 2004; Lazonick and Prencipe, 2005; Menguc and Auh, 2006). For example, Menguc and Auh (2006), in their study of creating firm-level DCs, found that developing the DC of market orientation is enhanced when it is adequately complemented with the DC of innovativeness. According to them, innovativeness is a DC which is created as a by-product of innovation and can be used to generate other DCs such as market orientation. Their conclusions reveal that customer orientation, competitor orientation and inter-functional coordination, which constitute market orientation, will contribute to firm performance when they are complemented by innovativeness. Daniel and Wilson (2003) also identified innovation as a means to develop DCs. They identified two different types of DC, integrative and innovative. Although Daniel and Wilson (2003) and Menguc and Auh (2006) found that innovation leads to the creation of DCs, which supports this study, they failed to show how the DC of innovativeness is created.

Innovation has been classified in many different ways. The analysed data suggested that there are three different types of innovation: business scope, structural and organisational. Business scope innovation arises through developing business units that cater for new markets or new products groups, which are either new to the firm or to the world. A structural innovation focuses on innovation that involves reshaping the structure of the industry, which may have vertical and/or horizontal dimensions. For example, reorganising a supply chain into a novel group of partners and/or developing innovative systems of working with customers, developing new business models for customers, and horizontal mergers and acquisitions (Fitzroy and Hulbert, 2005). Organisational innovation involves the innovation of business processes, new organisational structures, new incentive systems and business models for the effective
operation of businesses Fitzroy and Hulbert, 2005). However, the DC literature does not consider all forms of innovative activities for developing DCs. The extant literature on innovation shows that business innovation is often linked with the development and renewal of DCs. This has resulted in the underdevelopment of the other types of innovation that are also important for that purpose. This present study has identified and explained all three types of innovation that are important for developing DCs.

There is a vast literature on business scope innovation related to innovation in areas such as R&D and NPD (e.g. Danneels, 2002; Deeds et al., 2002; Verona and Ravasi, 2003). For example, Deeds et al. (2002) focused on DCs and new product development in high technology ventures in new biotechnology firms to test the relationship between new product development capabilities and firms’ scientific, technological and managerial skills. Danneels (2002) studied the dynamics of product innovation and firm capabilities, and examined how product innovation contributes to renewal of the firm through its dynamic and reciprocal relation with the firm’s capabilities. However, the process of how the identified DCs are created before being used was not clearly explained in the reported research. Verona and Ravasi (2003) also identified that the DCs of innovativeness in NPD is created through knowledge-based processes that are dependent on a continuous mix of firm resources. They referred to knowledge creation, absorption and knowledge integration as DCs, but this study indicates that these are not DCs but rather a means to develop DCs. Although business scope is the most researched type of innovation for developing DCs, the processes through which the DCs are developed are not clearly defined. The present study has identified and clearly explained the process of creating DCs.

Literature on organisational and structural innovation for developing DCs is very limited (Katzy et al., 2001; Christiannse and Venkatraman, 2002; Macpherson et al., 2004; Andersson and Kaplan, 2004). Katzy et al. (2001) show how the innovation of a business process to support the entrepreneurial venturing of Siemens ICE led to the development of two DCs (incubating and grafting). McPherson et al. (2004) also found that the relational elements of inter-firm transactions provide entrepreneurs with the opportunity to expand their firm capabilities. Christiaanse and Venkatraman (2002) demonstrate how the innovation of an IT system and working with travel agents led to the development of DCs. Andersson and Kaplan (2004) identified that Dell and
Compaq structurally innovate business and customer models to develop and renew their DCs. These studies concentrated on one or two forms of organisational and structural innovation for developing DCs. In contrast, this study has identified and explained the different types of organisational and structural innovation for developing DCs (see sections 6.8.1.1.2 and 6.8.1.1.3).

7.4.5 Human Resource Activities (HRAs)

HRAs were also identified as one of the important internal activities through which DCs are developed in the two firms. HRAs refer to a firm’s activities that deal with the recruitment, training, development and motivation of people in the firm. According to David (2000: 270), “Well-designed strategic management system can fail if insufficient attention is given to the human resource dimension.” The HRAs that were discovered in the data for developing DCs were recruitment, training, and people development activities.

There is an extensive literature on the subject of HR and performance of firms. Although there is various HR literature that confirms that proper HRM is imperative to performance, this was found lacking in most of the extant literature on how DCs are created, especially in the strategic management literature. Two empirical works (Rindova and Taylor, 2002; Wooten and Crane, 2004) reviewed examine how firms create DCs through HRAs. For example, Rindova and Taylor (2002) found that one of the core activities through which DCs evolve is ‘upgrading the management capability’ of the firm and this is conducted through recruitment of senior people. Similarly, Wooten and Crane (2004) found four stages for developing DCs through such ideology: (1) developing of humanistic work ideology, (2) executing that humanistic work ideology, which leads to (3) HRM capabilities. These three stages lead to (4) preserving humanistic ideology. Stages (3) and (4) then lead to the development of service capabilities. These findings illustrate the importance of the use of HRA to develop DCs.

Although these studies did not examine in detail the various aspects of HRA that are important for developing DCs, they demonstrate this importance. The HRAs identified in these studies are similar to those of the developed theory; however, the literature focused only on top management recruitment for managerial skills and development of humanistic work ideology. The present study examined and explained the specific
HRAs for developing DCs which include recruitment, training and people development activities, effective people processes, reward systems, and a culture of work. The firms recruit both top and middle management for generalist, managerial and specialist skills, and employees are trained and developed for both current and future roles in the firm. The findings demonstrate that HRAs are very important in the development and renewal of DCs because to bring about change, the firms need people with the knowledge, skills and expertise. Through recruitment, training and people development activities, the firms develop their human capital, which assists them to develop DCs.

7.4.6 Collaboration

Extant literature in this area shows that the majority of collaborations formed today occur in rapidly changing industries and involve complex linkages in technology, R&D, and other knowledge-intensive activities (Hagedoorn, 1993; Simons and Royer, 2006) in areas of sharing knowledge and capabilities. Collaboration involves the potential synergies of firms in “the combining of complementary, but scarce, resources or capabilities (typically through multiple functional interfaces), which results in the joint creation of unique new products, services or technologies” (Dyer and Singh 1998: 662). This collaboration most often involves relationship in specific investments and sharing of knowledge, which enable firms to accomplish activities which they could not perform otherwise, at least not in a cost-effective manner. Partners in collaboration share its benefits.

The literature supports the findings of this study that collaboration is a means to develop DCs. However, the literature reviewed considers alliances as the most researched form of collaboration for developing DCs. For example, alliances are a means for accessing missing capabilities or combining resources in order to create new capabilities (Prahalad and Hamel, 1990; Hamel, 1991), alliances allow reinforcing the capabilities base of the firm (Kogut, 1988; Hamel, 1991), and alliances have proven to be a way to access capabilities quickly, to share the risk, to diminish uncertainty, and to benefit from reversibility (Balakrishnan and Wernerfelt, 1986; Hagedoorn, 1993; Parkhe, 1993). Both Andersson and Kaplan (2004) and Deeds et al. (2004) discovered in their studies that firms use collaboration in the form of alliances.
Although alliance was identified as advantageous for the firm and supports the developed theory, this study identified that collaboration for developing DCs goes beyond just alliances to include other forms of collaborative efforts such as research partnerships, specifically collaborating with universities in basic science, applied research, staff training, technology transfer, and research consortia for research and development. Also, external networking with stakeholders, which varies from direct to third party networking through which the firms develop long-term relationships with customers, competitors and partners to assist with the development of DCs. These other forms of collaboration for creating DCs were found lacking in the DC literature.

7.4.7 Acquisitions

The literature supports the findings in this study that firms acquire other firms in the process of developing DCs and this brings new ideas and resources into the firm from external sources (Henderson and Cockburn, 1994; Zollo and Singh, 1998; Eisenhardt and Martin, 2000). For example, Pettus (2002) found that acquisitions can assist in a firm's attempt to develop DCs by acquiring new technology, new operating capabilities, process innovation, specialised managerial expertise, or the ability to access markets not currently available. By acquiring value-added capabilities, the firm may have competitiveness over firms lacking such capabilities (Karim and Mitchell, 2000).

Acquisitions allow firms to undertake more substantial expansion involving discrete sets of resources that might prove to be difficult to develop internally (Karim and Mitchell, 2000). Developing DCs through acquisitions from other firms is very fast and may reduce the time required to access certain DCs that are required. Porter (1987) argues that acquisitions should be conducted in areas where the firm enjoys competitiveness, and there are benefits from sharing critical resources between the acquiring and acquired firms. Using acquisitions to access capabilities can be costly for reasons ranging from legal constraints to the necessity of leveraging the acquired capabilities (Hennart, 1988; Kogut, 1988, 1991; Barney, 1991; Quelin, 1997).

The evidence from the literature (Chatterjee, 1986; Singh and Montgomery, 1987; Lubatkin, 1987; Shelton, 1988; Seth, 1990; Chatterjee et al., 1992; Healy et al., 1992) suggests a complex relationship between the acquired and acquiring firm. This is due to the fact that to benefit from the acquisitions, acquirers must be able to integrate their
assets with those of the acquired firm. The integration process takes a long time and can be very delicate to handle (Capron, 1996); it could range from partial to full integration of a purchased firm. Integrating the acquired firm into the acquiring firm does not happen in a systematic way, and hence the findings from these studies suggest that positive benefits will accrue to acquiring firms depending on the degree of relatedness of their assets with those of the target firm. This is evidenced in the work of Anand and Singh (1997) who compared consolidation-oriented acquisitions with diversification-oriented acquisitions in the U.S defence industry. They found that consolidation-oriented acquisitions do result in positive abnormal returns, as well as in significantly higher post-acquisition cash flows, as compared to diversification-oriented acquisitions. The results from the literature are similar with the findings in this study.

Though the literature on acquisitions supports the creation of capabilities, it is worth noting that literature that directly links acquisitions with DCs is very sparse, hence the present findings add to the rare literature specifically on the process of developing DCs through acquisitions.

7.4.8 Learning

The analysed data suggested that learning acts as a link between the activities conducted and the actual development of the DCs. Learning focuses on the way new knowledge can be acquired and used in the firm. Learning activities refer to the capturing, articulation, organising, storing and utilisation of knowledge and experience of individual workers and groups within a firm (Zollo and Winter, 2002). There is conceptual and empirical literature on the subject of learning which supports the present findings that learning leads to the development and renewal of DCs. Most conceptual theories about learning and DCs were identified in the research works of Nelson and Winter (2000) and Zollo and Winter (2002).

Empirically, some research works (e.g. Danneels, 2002; Verona and Ravasi, 2003; Macpherson et al., 2004) identify learning as a means through which DCs are developed. For example, Verona and Ravasi (2003) posited that to understand the sources of continuous innovation, it is worth noting that DCs are made up of knowledge creation and absorption, knowledge integration, and knowledge reconfiguration. Danneels (2002) examined how product innovation contributes to the renewal of the
firm through organisational learning. The literature supports the present study that learning is important in the process of creating DCs in firms.

However, the literature reviewed revealed that although learning was identified as a means to develop DCs, the relationship between learning and DCs in the literature is unclear. Some authors argue that organisational learning is based on DCs, whereas others propose that DCs come about as a result of learning (Nelson and Winter, 1982; Zollo and Winter, 2002). From the literature, most of the researchers in the various disciplines, and most specifically, the evolutionary economist (Nelson and Winter, 1982; Zollo and Winter, 2002), maintain that DCs only occur from organisational learning. However, the findings from this study demonstrate that although learning is a fundamental part in the process of creating DCs, it is not a sufficient condition to create DCs to achieve competitiveness. There are resources and activities which are not considered in the literature of organisational learning and DCs, such as HRAs and cost of hiring staff and incentives to motivate them, which are important for developing skills and knowledge in the firm to create DCs. So, learning is one aspect of the process through which DCs are created.

Though there are varied conceptions about organisational learning and DCs, it is worth noting that learning and DCs are strongly interrelated in many ways. The findings in this study acknowledge that organisational learning is important for developing DCs but propose that it is not the only activity that determines the development of DCs, as suggested by Zollo and Winter (2002) and Zahra et al. (2006). It is rather an intervening mechanism between the other activities and the actual development of DCs because the people learn from these activities to develop DCs. Further, the organisational learning literature focused on how explicit knowledge is captured and utilised to develop DCs. However, how tacit knowledge is captured and utilised to develop DCs was not explained in detail. This study identified and explained the process of capturing and utilising both tacit and explicit knowledge to develop DCs.

The discussion reveals that the other theories in the literature share some similarities with the substantive theory developed in this study. Although these theories in the literature provide some information on the process of creating DCs, they are limited in assessing the process of creating DCs at the strategic level. The conceptual theories do not have empirical backing of how DCs are created, whilst most of the empirical
theories on the process of creating DCs were functional level-based models. These functional level models do not adequately describe and explain the process for developing DCs at the strategic level. Even some of the functional activities identified from the data for developing DCs were still underdeveloped in the literature. An empirical study of the process of creating DCs at the strategic level is very significant in extending theory and literature of strategic management discipline.

7.5 SUMMARY

This chapter presented a discussion of the substantive theory of the process of creating DCs. It discussed how two types of DC: ‘innovativeness’ and ‘market orientation’ are created, using the model developed. The chapter then presented a critique of the developed theory in relation to literature on the process of creating DCs at the strategic level, and the core components of the theory. The discussion focused on how the literature shares some similarities and differences with the substantive theory and the core components of the developed theory.
CHAPTER 8 CONTRIBUTIONS, LIMITATIONS AND FUTURE RESEARCH

8.1 INTRODUCTION

This chapter presents the conclusions of this study. The first part of the chapter reviews the research question and the objectives outlined in Chapter 1. This is followed by a discussion of the contributions of the study and how they address the research question and objectives. The second part of this chapter outlines the limitations of the study and the potential areas for future research.

8.2 REVIEW OF RESEARCH QUESTION, AIM AND OBJECTIVES

This thesis explored the process and content of how DCs are created using a qualitative research method. The main aim of this study was to develop a theory of the process of creating DCs at the strategic level. Although the DC concept has been identified as a potential source of competitiveness in firms (Teece et al., 1997; Zahra et al., 2006), the literature review in Chapter 2 demonstrated that there is a lack of coherent theory of how DCs are created at the strategic level. Therefore, there have been calls for further research to develop a coherent theory of creating DCs at the strategic level (Easterby-Smith et al., 2006; Helfat et al., 2007).

To fill this gap in the DC literature, the main research question of this study was: *How do Firms Develop DCs?* To answer this question, the researcher collected empirical data and developed a theory of the process of creating DCs. The theory was developed through a field study conducted to examine how DCs are created in the context of two firms. Three research objectives developed from the data were explored to answer the main question of how DCs are created:

1. To *identify the factors that contribute to the development of DCs*. This objective was achieved through interviewing participants, specifically to identify the reasons why they create DCs in their firms. The DC literature was used during the analysis to synthesise the causal factors for developing DCs at the strategic level identified from the data.
(2) To determine the resources required to develop DCs. The key resources typical for the development and renewal of DCs were identified with an explanation of their roles in the development and renewal process. This was achieved through interpretation of the data collected. The participants in the study indicated the key resources and explained the role resources play in the development of DCs. Extant literature on the process of creating DCs and resources for developing DCs were reviewed to synthesise the resources that emerged from the data.

(3) To describe the actual strategies and activities employed to create DCs. The specific types of strategies and activities for developing and renewing DCs in the two firms were identified from the participants’ accounts during the interviews, and the interpretation of the data collected. Literature on the process of creating DCs was reviewed to synthesise the strategies and activities that emerged from the data.

The data generated were analysed, using the constant comparison method to develop concepts and categories with their properties and dimensions. The developed concepts and categories were then considered in extant literature on the process of creating DCs to develop the theory of the process of creating DCs at the strategic level (as discussed in detail in Chapters 6 and 7). The next section discusses the key contributions of this study.

8.3 KEY CONTRIBUTIONS OF STUDY

This study contributes to knowledge of the process of creating DCs. The findings from this study illustrate how firm practices in the real world work context were used to develop a theory of creating DCs at the strategic level. This theory therefore shows the various iterative and simultaneous practices involved in the process of creating DCs.

The present study makes several contributions to the DC literature. This study has: (1) identified the process and explained the key determinants, resources, strategies and activities of creating DCs at the strategic level, (2) derived a model for creating DCs at the strategic level, (3) confirmed and extended existing theories on the process of creating DCs, (4) discovered the use of a hybrid of planned and emergent strategies to develop DCs, (5) identified the types of innovation for developing DCs, (6) identified
HRAs as important for developing DCs, (7) identified the types of collaboration for developing DCs, (8) identified learning as an intervening mechanism for creating DCs, and (9) contributed empirically to the theoretical extension of the process of creating DCs, and the body of knowledge of the DC concept and the strategic management discipline. These contributions are explained in the following sections.

8.3.1 Theory of Process of Creating DCs at Strategic Level

In Chapter 6, the study demonstrated how the participating firms develop DCs due to certain external challenges within their operating and remote environments. These external challenges become internal challenges to the firms to ensure efficiency and effectiveness to meet changes in the market. The firms therefore develop DCs to enable them identify and take on opportunities that arise in their operating environments.

The theory demonstrates that developing DCs involves constant surveillance (scanning) of internal, operating and remote environments to identify factors within and external to the business that prompt changes and therefore, the types of DCs that have to be developed to meet these changes. The theory uncovers several factors that prompt firms to develop DCs: improving efficiency in the business, changing customer demands, new industry and government legislation, competition, technology developments and market changes. Although these factors are commonly known in business cycles, they are an important part of the theory because they assist the firms to understand which DCs have to be developed for the effective operation of their businesses. This part of the theory demonstrates that the developments of DCs are shaped by the challenges from the external environment and not necessarily by the path dependencies of the firm alone (cf. Teece et al., 1997). More importantly, constant surveillance of the business environment ensures that firms are up to date with developments and changes in their business, and are developing and renewing their DCs to be flexible enough to adapt to changes in the operating and remote environments. Thus, it is important that firms are continuously aware of their operating and remote environment challenges by making every effort to find out the dynamics of the markets within which they operate. Without understanding the market, firms would not know which DCs are important and therefore worth developing to improve and sustain competitiveness in their markets.
The strategies adopted to develop DCs are both purposeful and emergent, and hence the process of creating DCs can be planned and/or emerges during the process. Identifying the strategies was an important part of the theory because it stipulates what types of DCs have to be developed in relation to the goals of the business and how they would be created. The findings revealed that the planned strategies used to develop DCs are business and product strategies. These strategies assist the firms to define the products to be developed, the type of capabilities required to develop these products, and the specific investments to make to create the required DCs. These plans could be for 2-3 years and 3-10 years. Although both firms have planned strategies to develop DCs, some of the strategies emerge during the operations of the business through actions such as opportunity taking, learning, and support for innovations, which are then built into the operations of the business to develop DCs. These strategies are then implemented through the combination of resources and certain activities to develop DCs.

Developing DCs requires resources. Both tangible (physical and financial) and intangible (human, structural and relationship capital) resources were identified as the key resources for developing and renewing DCs. The findings show that managers develop DCs both directly and indirectly through the combination of tangible and intangible resources and activities. This aspect of the theory shows the relationship between resources, activities, and the development of DCs. This is because to acquire the experience, knowledge and skills for developing DCs, the firms combine tangible and intangible resources such as funding; infrastructure; human, relationship and structural capital; and certain internal and external activities; in-house innovations, HRAs, collaboration and acquisitions. Hence, without key resources, the firms cannot develop the required DCs alone with the internal and external activities to acquire the experience, knowledge and skills to develop DCs. Therefore this study identifies the specific key resources required and the relationship between resources and activities for developing DCs at the strategic level.

The findings further illustrated that DCs are developed in the firm through internal developmental approaches which involve activities such as continuous in-house innovation; business scope, structural and organisational innovation and HRAs; recruitment, developing and training people and external collaboration: alliances,
research partnerships, networking with partners and customers, and acquisitions of other firms’ capabilities. The theory demonstrates that there are underlying bases through which firms conduct these various activities. For example, to conduct recruitment requires the necessary financial resources to be in place, recruitment procedures, and management to implement the recruitment activity (see sections 6.8.1 and 6.8.2).

The firms must conduct all aspects of each activity, but undertaking these activities alone does not lead to the development of DCs, rather the firms gain knowledge, experience and skills. They learn from the experience and skills and apply them to their operations to develop DCs. This theory therefore demonstrates that these activities: in-house innovations such as product development, alliances, research partnerships, networking and acquisitions are not DCs, as suggested by some researchers (Eisenhardt and Martin, 2000), rather they are the means through which firms gain knowledge, experience and skills to develop and renew DCs. Learning thus acts as an intervening mechanism through which the firms capture, articulate and utilise the knowledge, experience and skills gained from conducting these activities, to develop DCs. The firms have to learn from the knowledge and skills developed from the activities conducted, and apply them appropriately to the operations of the business to develop DCs to meet the challenges in the external environment. As a result of this process, the two firms develop difficult-to-imitate DCs, such as innovativeness, market orientation, ability to manage HR, knowledge, collaboration and acquisitions, which set them apart from other firms when used appropriately to perform, achieve and sustain competitiveness in their dynamic markets.

This study demonstrates that the process of creating DCs at the strategic level impacts on key areas of the business. That is, technology, people and processes, because these are the core areas of operations of the businesses of the participating firms. Developing DCs, therefore involves firm-wide efforts, continuous improvement, learning and adaptation, and continuous change, which is a long-term orientation. Hence, the process of creating DCs is a continuous evolutionary process in the firm which is gradual, piecemeal and undramatic, and constantly maintained over a long period of time with flexibility for adaptation. The theory further demonstrates that with a continuous
balanced combination of key resources and activities, and learning in a coordinated way, it is made possible for firms to develop a difficult-to-imitate set of DCs.

However, just developing DCs alone cannot lead to automatic success, as they have to be applied appropriately to be successful. Simply developing DCs does not necessarily lead to enhanced performance or sustained competitiveness. This is because when the DCs are inappropriate, weak or inadequate, they can lead to loss of competitiveness (West and De Castro, 2001; Arend, 2004). Since this theory illustrates the entire process of creating DCs at the strategic level, it can be used for research and practice on this process. This study clearly fills a gap in the theoretical and practical literature on the process of creating DCs at the strategic level.

8.3.2 Model of Creating DCs

This study has also derived a model for creating DCs at the strategic level. In developing DCs, identifying opportunities and organising them effectively to exploit existing capabilities and develop new ones can be a daunting task. In such a situation, it is important to understand the architectural structure of the capability-creation process of firms. This model was derived through the data analysis, using the constant comparison method, writing memos and drawing diagrams depicting the emerging theory (see Chapter 5). The model (illustrated in Figure 6-1) comprises a series of iterative and simultaneous practices for creating DCs. The model shows the various components of the process of creating DCs, which is enabled by specific conditions, strategies, developmental approaches and activities that lead to the development and renewal of DCs in firms, as illustrated in Table 8-1. The literature reviewed revealed the lack of an empirically coherent framework for developing DCs at the strategic level. Hence, this model fills this gap and would therefore assist firms and academics to understand the process and the various components for developing DCs.
Table 8-1 Summary of Components of Model

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Changing customer requirements, New legislation, Competition, Market changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategies</td>
<td>Planned and Emergent</td>
</tr>
<tr>
<td>Key Resources</td>
<td>Tangible and intangible resources</td>
</tr>
<tr>
<td>Internal and External approaches and activities</td>
<td>In house innovation, HRAs, Collaboration, Acquisitions</td>
</tr>
<tr>
<td>Learning</td>
<td></td>
</tr>
<tr>
<td>DCs</td>
<td>Innovativeness, Market orientation, Ability to manage: Human resource, Knowledge, Collaboration, Acquisitions</td>
</tr>
</tbody>
</table>

8.3.3 Confirmation of Existing Theories on the Process of Creating DCs at Strategic Level

This study also contributes to the confirmation and extension of existing theories on the process of creating DCs. As noted in the literature review in Chapter 2 and discussion in Chapter 7, most of the theories for creating DCs are conceptual. However, the empirical findings of this study confirm and extend some of these existing theories.

The Teece et al. (1997) theory of creating DCs through organisational processes which are internal (innovations) and external (alliances and buyer relations and technology collaborations) development, asset position and learning were confirmed as components of developing DCs in the present study. However, these activities identified for developing DCs in their theory did not show details of the types and degree of these activities and resources used. They also identified learning as the basis of creating DCs, but did not establish the role learning plays in the development process. This present theory confirms the need for learning as well as its role in the process for creating DCs. Teece et al. (1997) also identified that path dependencies shape the development of DCs; however, the present theory shows that it is the external environment that shapes the development of DCs and not path dependencies. This study has extended the Teece et al. (1997) theory through the identification of the types of activities used, providing clarity on the role learning plays in the development process, identifying a hybrid strategy for developing DCs, identifying that factors in the external environment shapes
the development of DCs and determining that HRAs are an important component of the process of creating DCs.

Eisenhardt and Martin (2000) identified the process of creating DCs as guided by well-known learning mechanisms, gaining and releasing resources, resource integration and resource reconfiguration. Their process involves both internal and external developments: product development, alliances, strategic decision-making, acquisitions, project teams, constant surveillance, intelligence gathering, and learning. The emerged theory confirms these as components of the process of creating DCs. However, Eisenhardt and Martin (2000) maintain that the activities of product development, alliances, strategic decision-making, acquisitions, and project teams for developing DCs are, in fact, DCs themselves. The present theory shows that these activities are not DCs, but rather they are the means by which the DCs at the strategic level are developed, renewed and utilised. Hence, DCs are not processes, as suggested by Eisenhardt and Martin (2000), but rather the abilities of firms to develop and transform the processes and static organisational capabilities in the firms to achieve change. Further, they also did not explain in detail the types, degree, and intensity of activities for developing DCs, and the role of learning in the development process was not explained. This emerged theory identified and explained all these various components that are lacking in Eisenhardt and Martin's (2000) theory.

Zollo and Winter's (2002) theory attributes the development of DCs to collective deliberate learning. They identified three learning activities: knowledge creation, capture and articulation, which lead to DC development. They also identified the types of knowledge for creating DCs as tacit and explicit. This theory confirms Zollo and Winter's work as part of the process of creating DCs at the strategic level, but identifies that deliberate learning is only one of the components of the process, and not the whole process. Learning acts as a mechanism or link between different activities and the development of DCs in this theory. Zollo's and Winter (2002) work is also extended through identifying that the development of DCs at the strategic level involves certain developmental decisions, strategies, resources and activities as well, which are important.
The Zahra et al. (2006) theory postulates that DCs are created due to changes in the external and internal context (competition, lack of success with current substantive capabilities) of the firms through entrepreneurial activities, dedicated leveraged resources, skills, and organisational learning and behaviour processes. The emerged theory confirms these as components of the process of creating DCs at the strategic level; however, this theory extends theirs in the following ways: (1) They focused on entrepreneurs, and because of that these firms have challenges to keep up with competition. Since this theory was developed from established firms, the challenges have been extended to include challenges facing established firms to develop DCs. (2) They identified strategies and integration and coordination activities, but did not explain in detail the types of strategies, developmental approaches and activities, and in turn, how these are combined to develop DCs. This present theory builds on to explain the specific type of strategies, developmental approaches and activities used and how these are combined to develop DCs. (3) They identified learning as part of the process of creating DCs at the strategic level, yet did not explain the role it plays in the creation process. This theory has extended that by explaining the role that learning plays in the process of creating DCs at the strategic level. (4) Zahra et al. (2006) identified cost as a factor in developing DCs, yet they did not relate it to any of the components of the process. The present study identified cost and located it as one of the factors for selecting a particular developmental type for creating DCs at the strategic level.

Sections 8.3.4 to 8.3.9 explain in detail further contributions of this study that are new and extend existing understanding on the process of creating DCs at the strategic level.

8.3.4 Hybrid of Planned and Emergent Strategy for Developing DCs

The strategy literature suggests that organisations use either planned or emergent strategies (Ansoff, 1965; Allison, 1971; Quinn, 1980; Mintzberg, 1994). From the literature reviewed, studies on the process of creating DCs (e.g. Volberda and Baden Fuller, 1998; Andersson and Kaplan, 2004) did not identify that firms employ a hybrid of planned and emergent strategies to develop DCs at the strategic level. The findings in this study however demonstrate that such a hybrid is used to develop DCs. The participating firms have planned strategies in the form of a business strategy and product strategy. However, to develop DCs, the firms maintain a degree of flexibility to
allow strategies to emerge during their operations, which fosters generative and adaptive learning. With this flexibility, the firms learn new things, develop new business practices, and innovate new products. As a result of this, the firms develop and renew their abilities to perform these activities and seize new opportunities that arise. The theory therefore suggests that to develop DCs, managers have to use both planned and emergent strategies. The knowledge that DCs are developed from both strategies is important to both practitioners and academics. Practitioners will use it to develop DCs in their businesses, and academics will use it for future research and teaching in strategy.

8.3.5 Identification of Types of Innovative Activities for Creating DCs

The literature review in Chapter 2 and the discussion of the theory in Chapter 7 illustrate that innovation leads to the creation of DCs. However, the literature concentrates on business scope innovation, such as new product developments or R&D as the most researched form of in-house innovation for developing DCs. The present theory, however, identified that using in-house innovation to develop DCs goes beyond business scope innovation to include organisational and structural innovation (see section 6.8.1.1). Innovating a new product alone is not a sufficient activity to develop the DC of innovativeness, it should transcend to all three areas of innovation: business scope, organisational and structural. The three types of in-house innovation support each other in developing DCs in firms. Thus, firms that invest in only one type of innovation without investing in the others will end up with an unbalanced approach to their products and the markets. For instance, innovating quality products (business scope) without a customer care model (structural innovation) will mean lack of feedback on how customers feel about these products. Hence, managers will lose touch with their markets, and products and services would be inconsistent with the changing needs of their customers. This could lead to a decline in the competitiveness of the business and consequently the possible loss of competitiveness. This study therefore contributes to the theoretical and practical knowledge of the DC concept through the identification and explanation of the specific types of in-house innovation for creating DCs at the strategic level in firms.
8.3.6 HRAs Importance for Developing DCs

From the literature review in Chapter 2 and the discussion in Chapter 7, there are only a few functional level studies (e.g. Rindova and Taylor, 2002; Wooten and Crane, 2004) that link HRAs with the development of DCs. However, these studies only identified two aspects of the HRAs for developing DCs: recruitment of top management and the development of a humanistic ideology. The findings from this study contribute to the DC and HR literature through the identification and explanation of the different types of HR activities for developing DCs, which include recruitment, training and people development activities, effective people processes, reward systems, and a culture of work. The findings also show details of the amount and type of people recruited, and how the people in the firm are trained and developed to assist with the creation of DCs. Such detail is lacking in the DC literature. The findings suggest that firms recruit both top and middle management for generalist, managerial and specialist skills, and employees are trained and developed for both current and future roles in the firm. These findings will assist academics and practitioners to understand the types of activities for developing DCs at the strategic level, the form of HRAs, and how they assist with the development of DCs.

8.3.7 Identification of Types of Collaboration for Developing DCs

It was found that firms collaborate with stakeholders to develop DCs. The literature review and discussion of the developed theory in Chapters 2 and 7, respectively, revealed that the most researched form of collaboration for developing DCs is alliances. The present study discovered that though alliances assist firms to develop DCs, they are not the only form of collaboration for developing DCs. The findings from this study suggest that firms enter into partnerships with universities (UTPs) for basic science, applied research, staff training, and technology transfer. The firms also collaborate with partners and competitors in the form of research consortia to conduct R&D. The firms also conduct external networking with stakeholders directly through developing long-term relationships with customers, competitors and partners, which assist with the development of DCs. These collaborative activities, although widely recognised in general management literature, have not been linked with collaborative activities for developing DCs. Since the literature on the process of creating DCs concentrates on alliances as the main collaborative form for developing DCs, this finding expands the
literature on collaboration and the DC concept. Through the identification and explanation of the different forms of collaboration for creating DCs, this study clearly fills a gap in the DC literature and enhances the knowledge of collaboration for both academics and practitioners.

8.3.8 Learning as Intervening Mechanism to Develop DCs

Learning was identified as part of the process of creating DCs at the strategic level. In the literature review, it was discovered that the relationship between learning and DCs is unclear. Some organisational learning theorists maintain that DCs are developed solely from organisational learning, whilst others argue that organisational learning is based on DCs (see section 7.4.8). Although the present findings confirm that learning plays a significant role in developing and renewing DCs, the theory suggests that DCs are not developed solely from organisational learning, nor is organisational learning based on DCs alone. The two firms develop DCs through a process, and there are different components of this process of which learning is one. During this process, the firms develop strategies and conduct certain activities such as in-house innovation, HRAs, collaboration, and acquisitions, which lead to the accumulation of knowledge, experience and skills. However, conducting these activities alone and accumulating the knowledge, experience and skills do not necessarily lead to the development of DCs. The firms learn and apply these skills and experience before they can develop DCs.

Therefore, learning acts as an intervening mechanism for developing DCs between the activities and the development of DCs in the two firms. Thus, the findings from this study suggest that the assertion that DCs are developed solely from organisational learning is not acceptable. Again, the DC concept is a relatively new one. Although it has links with earlier theories such as organisational learning, the concept of organisational learning which started in the 1970s could not be based on a concept that was partially or not discovered at that time. Hence, this study contributes to the DC literature by clarifying the relationship between organisational learning and the development of DCs, as well as the role learning plays in the development process of DCs.
8.3.9 Contribution to Theoretical Development and Body of Knowledge of DC Concept and Strategic Management Discipline

It was argued by Williamson (1999) that the DC concept lacks an empirical base and is a tautological concept. Further, researchers such as Teece et al. (1997), Eisenhardt (2000), Zollo and Winter (2002), Dougherty et al. (2004), Hilliard (2004), Keil (2004), Volberda (2004), Ethiraj et al. (2005), Easterby-Smith et al. (2006) and Helfat et al. (2007) have argued that the process of creating DCs at the strategic level lacks empirical research, and hence the need for both theoretical and empirical research to strengthen the DC concept. This study has developed a theory of the process of creating DCs at the strategic level. The literature review in Chapter 2 and the discussion in Chapter 7 demonstrate that this is an empirically researched, coherent theory of the process. This therefore contributes to the theoretical development and the extension of the body of knowledge of the DC concept, specifically on the process of creating DCs at the strategic level.

The development of a theory of the process of developing DCs at the strategic level in the strategic management discipline is significant, since the literature in this discipline lacks one. This study serves to cement together the various areas of previous research about DCs which focused only on the creation of conceptual and functional DCs, and new research. Further, this study shows how the multidisciplinary integration of concepts in such areas as innovation, organisational learning and HR assisted with the understanding and clarification of how these concepts in these disciplines influence the creation of DCs in the strategic management discipline. This approach is consistent with the writings of Jemison (1981), who advocates that doctoral students in strategic management should adopt a multidisciplinary approach to develop richer and more complex models of strategy concepts. Hence, this study contributes to the theoretical and empirical knowledge of the process of creating DCs at the strategic level in the strategic management discipline.
8.4 IMPLICATIONS OF STUDY

Although the main focus of the empirical investigations in this study was to develop a substantive theory, the theory developed has practical applicability in the two firms examined. This theory, therefore, can be a source of knowledge for both future research and practitioners within different businesses.

8.4.1 Implications for Research

First, the findings and discussion in Chapters 6 and 7 reveal that this study responds to a clear gap in academic research and literature on the process of creating DCs. From the literature review in Chapter 2, it is noted that although the functional-based process of developing DCs is already making some progress in empirical research in certain disciplines (for example, cognitive psychology or organisational theory and IT strategy), the actual strategic level process is still undiscovered or only partially discovered in these disciplines, as well as in the strategic management discipline. Although the cognitive psychology or organisational theory and IT strategy may offer important insights and support the findings of the process of creating DCs in the strategic management field, they cannot replace research in the strategic management discipline. It is necessary to study the same issues and objectives from different perspectives and using discipline-specific methods, depending on the purposes of the research (Rouse and Daellenbach, 1999). This therefore limits the usefulness of these studies alone to develop a theory when the purpose is to find empirical evidence on the process of creating DCs in the strategic management discipline. Thus, bringing together all of the different components into a process which is grounded in data to explain how DCs are created at the strategic level has contributed to knowledge in the strategic management field.

Consequently, this study has contributed to the theoretical extension and the body of knowledge of the DC concept by empirically examining and explaining how DCs are created. The theory provides an understanding of the different components, and significant practical experience of the process of creating DCs at the strategic level in the two firms studied, which is empirically testable. This theory therefore presents a framework which organisational theorists, strategists and researchers could use to analyse issues of creating DCs in research and practice, and to extend the theory.
Second, this study discovered an important aspect of the process of creating DCs, that is, the relationship between creating DCs and organisational learning. Most organisational learning literature (e.g. Winter, 2002; Zahra et al., 2006) attributes the creation of DCs to organisational learning. This researcher accepts that organisational learning is important for creating DCs, but rejects the claim that the process of creating DCs is achieved only through organisational learning. This study identified that learning is an intervening mechanism between the activities and the development of DCs. The different components of the model cannot create DCs without learning being in place, but learning on its own is not shown to create DCs. This is a significant departure from normative assumptions provided in the literature. Therefore researchers, academics and practitioners can benefit from this clarification of the relationship between organisational learning and the creation of DCs, as well as the role that organisational learning plays in the creation of DCs. This should also show new directions for future studies on DCs, in particular when attempting to assess the benefits of DCs and in determining how to maximise performance through DCs.

Third, this study confirms the applicability of the GTM in DC research. The empirical literature reviewed in relation to the process of developing DCs used inductive case studies and a few researchers employed quantitative studies (Deeds et al., 2002; Daniel and Wilson, 2003; Wooten and Crane, 2004). The DC concept is still underdeveloped, and therefore it is important to use a context-specific methodology with rigour to develop such a theory. Deeds et al. (2002: 226) stated that “If capabilities are complex assets based on combinations of routines, skills, firm knowledge, and tangible assets, we need to use multiple indicators to capture the capabilities. Single measures are destined to miss important aspects of the capability or capabilities of interest. In addition, knowledge of industry context is crucial in developing the appropriate measures of firm-specific capabilities”. Their study therefore emphasised the importance of using a methodology that can capture the context as well as additional information on the process of creating DCs to avoid omitting certain important aspects of capability creation. This confirms the appropriateness of using a methodology such as the GTM that captures the internal context of the firm’s capability creation, which was ignored in the Deeds et al. (2002) studies.
Only a few researchers have used GTM for developing DCs (e.g., Rindova and Taylor, 2002; Keil 2004; Dougherty et al., 2004). It must be noted that most of these studies were focused only on a functional process and not on a strategic level process. Although some of the researchers (e.g., Rindova and Taylor, 2002; Keil 2004) used the GTM in their studies, they did not adequately explain the processes through which data were analysed to arrive at the substantive theory, perhaps due to the limited space available for their articles. Chapter 5 of this thesis demonstrates practically in detail how the GTM was used to identify the various components in the process of developing and renewing DCs at the strategic level and provides enough detail to enable future replication. Further, in this study, the model for creating DCs was explained in detail with a trail of evidence of how the theory evolved. Therefore researchers can use this GTM as a guide for further studies on the DC concept.

8.4.2 Implications for Practice

Several practical implications for managers arise from the contributions of this study, especially for those firms operating in dynamic markets. The findings demonstrate that creating DCs is important to the participating firms because it assists them to sustain competitiveness in their markets. Prior to this study, the process of creating DCs was limited to conceptual and narrow functional theories. Further, although the participating firms develop DCs at the strategic level, they have not categorised the process into a model. This study brings about awareness in the firms of the key resources required and everyday activities undertaken that create DCs at the strategic level. Although all resources are important for the operations of the firms, this study delineates the key resources that are critical for the success of the firms, and hence worth developing.

The DC literature recognises that the potential success of firms operating in dynamic environments depends on how managers create DCs to adapt to changes in the environment to enhance their products and services. This study demonstrates that the continuous development and effective utilisation of strategic level DCs in the firm can lead to success of firms operating in dynamic contexts. DCs allow firms to improve and sustain their competitiveness because it enables them to create value and flexibility to adapt to changes. Therefore, the development of a practical model from the context of two firms (see Figure 6.1) suggests the process through which managers can develop DCs, and emphasise both internal and external development approaches to acquiring
DCs. It is important to note that while firms tend to emphasise the process of creating DCs internally, it is equally important to place emphasis on the creation of DCs externally, as both play significant roles in the DC development process.

This model will help managers to understand the components of the process and the underlying bases that are observable and can be replicated when the aim is to develop DCs to achieve or sustain competitiveness. The model was created using two firms, hence it is a practical theory, and the activities are based on their real work practices. The knowledge of the practical theory of the process of creating DCs will thus assist managers to recognise what it is they do every day that contributes to the creation of DCs. It will give them the opportunity to select and integrate the various components of the process appropriately to optimise the development of DCs in their respective firms. This study therefore contributes to the understanding, and informs managerial practice of how DCs can be developed: the strategies, activities, key resources, and the outcome of the process.

Further, in Chapter 6, the study demonstrated that developing DCs at the strategic level is beneficial. Thus, developing one functional area without the others could bring abysmal results. For example, investing more in innovation without the corresponding investment in other areas such as people and processes towards the market side would mean an unbalanced approach towards the market. Hence, managers would lose touch with the market and develop products and services which may be inconsistent with customer desires and demands. Therefore, it informs managerial practices of the potential limitations if they invest in part of the business to develop DCs, and neglect others.

8.5 LIMITATIONS OF STUDY

Although the study developed a coherent substantive theory of the process of creating DCs in strategic management, it has some limitations. First, whilst the findings of the study from the two firms demonstrate the process for creating DCs, the application of the theory for developing DCs is suitable only for the industry in which the two firms studied operate (technology industry: software and manufacturing sectors). Its application in other industries may be limited, because this study was based on a GTM
approach. Although this methodological approach provides an opportunity for rich data and the development of a theory, it does however impose some limitations on the findings. Generalising the findings may be limited to the software and manufacturing sectors of the technology industry (Glaser and Strauss, 1967; Strauss and Corbin, 1998). Generalising the findings is limited to the studied firms because data were only collected to generate a substantive theory from the two firms, and according to Glaser and Strauss (1967), findings from a substantive theory are limited to the substantive areas for which data were collected and cannot be generalised to other substantive areas for which data were not collected.

Second, grounded theorists only collect data to develop theory. Unlike other inductive forms of analysis, the theories developed are not tested. Although the theory developed is verified through constant comparison with data collected throughout the research, the theory developed was not tested, as theory testing is not part of the GTM. This is because GTM aims at generating theory of the general features of a phenomenon, and once the concepts and categories are saturated, no additional data could be collected to provide in-depth descriptive detail. So, data are collected to generate a theory but not to test the theory. The theory remains as suggestions that could be validated through other methods.

Third, the GTM is very difficult and risky. It is reasonably restricted to phenomena that have no theory, and researchers have to develop a theoretical framework through the collection and analysis of data. It involves long periods of uncertainty in the early phases of theory building. This approach therefore demands a high level of theoretical sensitivity on the part of the researcher to succeed. The GTM requires an extensive coding and analysis process to generate theory, and data collection is dependent on the emerging theory (Glaser and Strauss, 1967). Since data collection is dependent on the emerging theory, the researcher could not plan with a detailed breakdown of timings, number of people to be interviewed, and amount of time necessary for the research (Glaser and Strauss, 1967).

Fourth, a significant limitation of this study is the type of theory developed. This study only developed a substantive theory of the process of creating DCs at the strategic level. Developing a formal theory of DCs would involve investigations into the different substantive areas of the DC concept, or using extant literature in the different
substantive areas. This study could have developed a formal theory of the DC concept; however, this was limited by the resources (time and money) available for research into the other substantive areas. Further, since the DC concept is underdeveloped, the researcher could not even use empirical literature to develop a formal theory.

Fifth, gaining access to firms to pursue a study of this nature was a limitation. The data for the study were collected from two sites only in the technology industry. The theory could have been enriched with more data sources from other firms. However, this was limited due to difficulty in gaining access to conduct research. Most of the firms selected did not want to engage in areas that border on their competitiveness, and therefore declined the invitation to participate. Some of the firms contacted expressed concern about the nature of the research. They argued that since the research is about how they develop capabilities, by taking part in such a study they would take the risk of making their process of creating capabilities accessible to competitors. The researcher even assured the firms they could be anonymous and that the findings would be presented with a pseudo name, but they declined this offer. This was made evident during the investigations in the two participating firms when some information was designated as classified, and therefore the researcher could not have access to it. Although two firms eventually agreed to take part in the study, subsequently obtaining access to the participants for the study was also difficult. The participants were senior and middle management, and as such, their time was understandably an issue which limited the steady progress of data collection.

Sixth, one of the limitations of qualitative research is potential researcher bias due to the subjective nature of the study. Several steps were taken during data collection and analysis to eliminate such researcher bias (Chapters 4 and 5). However, it could not be fully eliminated. For example, due to the interpretation of events from the point of view of participants, the researcher could end up taking over any biases built into their perspectives. Efforts were made to minimise this through comparative analysis of previous data collected with subsequent data from different participants. Also, the process of asking questions and redirecting the focus of the interviews during data collection could be a potential source of bias; however, this was minimised with the use of both unstructured and semi-structured interview methods. Therefore, the steps taken
in Chapters 4 and 5 assisted in minimising the impact of researcher bias in this study, but it is accepted as a limitation of this research, nonetheless.

Seventh, the theory developed from this study was based on the creation of DCs to achieve and sustain competitiveness. Although there was some evidence from the participating firms of the relationship between developing DCs and competitiveness, this theory did not evaluate the relationship between the developments of DCs and achieving and sustaining competitiveness in firms. The theory did not construct any measurement matrix to identify the impact of the creation of DCs on the performance of the firms studied.

Eighth, one limitation of the DC concept is that the value of DC is defined in terms of its effects on performance, and superior performance is equated with the possession of DCs (Williamson, 1999; Priem and Butler, 2001; Zahra et al., 2006). This characteristic of DCs suggests that possessing DCs leads to superior performance. In this study, 'superior' performance was not equated to DCs, and the criterion of 'good' performance was used simply as a means to identify possible companies to research and for replication purposes (Yin, 1989). However, using good performance as a criterion for site selection suggests that the value of DCs was defined in terms of its effects on performance. Hence, it is accepted as a limitation of this study.

8.6 DIRECTIONS FOR FUTURE RESEARCH

While this study represents a step forward in the theoretical development of the process of creating DCs, it has generated many interesting and promising areas for future research. The possible areas for extending this study are now discussed.

First, this study developed a substantive theory of developing DCs, and has empirically established the key constructs in a framework of the process of creating DCs. Substantive theories are limited to the particular substantive area of investigation. Since the DC concept is still underdeveloped (Teece et al., 1997; Eisenhardt, 2000; Zollo and Winter, 2002; Dougherty et al., 2004; Hilliard, 2004; Keil, 2004; Volberda, 2004; Ethiraj et al., 2005; Easterby-Smith et al., 2006; Peteraf, 2006), this theory can be used as a basis for generating a formal theory of the DC concept. Formal theories can be
interesting and useful to provide a formal guarantee that mechanisms of the DC concept would be robust under replication. It would also improve the understanding of the DC concept. Future research for developing a formal theory of DCs should study all the other substantive areas of the DC concept. This study could involve substantive areas such as what DC is, what role it plays in the firm, how it is implemented, what relationship is between DCs and performance, and what the difference is between good and bad DCs. This could be done by using the model developed in this study as part of the formal theory, or using it as a framework to collect more data on the process of creating DCs.

Second, although the validity of the theory was ensured using the constant comparison method, the developed theory was not tested, as theory testing is not part of the GTM approach. Therefore, future research work is required to test the process of creating DCs on a wider scale, both quantitatively and qualitatively. The future research should focus on validating the model developed in firms other than the ones used here to develop the theory. Validating this substantive theory and model in other firms would assist to verify the scope and utility of the model in different contexts and to enrich the theory.

Third, this study identified some DCs from the process. Although these DCs were identified, the DC concept is still underdeveloped; hence, firms may undoubtedly possess additional DCs which were not discovered in the firms examined. Future research could focus on identifying the various types of DCs in firms and how they are created, to enhance the model of creation of DCs and knowledge of how this occurs.

Fourth, one very interesting area for future research is the relationship between DCs developed from the process and sustaining competitiveness. This is very important, because though this study mentioned a relationship between developing DCs and sustaining competitiveness in firms, it did not evaluate it. This is another substantive area of the DC concept and therefore a fertile ground for further research to examine the relationship between DCs and performance to achieve competitiveness. This future study would have to identify the DCs in a firm and develop measurement matrices to measure the relationship between DCs that are developed, and how they impact on the overall performance of firms to achieve or sustain competitiveness.
Fifth, the data in this study suggested that developing DCs does not automatically lead to superior success. The DCs developed have to be applied appropriately to achieve performance and competitiveness. However, the theory did not explore the consequences on the performance of the firm of inadequate DCs and the misapplication of the developed DCs, so a future avenue for research would be to identify and explain the impact of inadequate and misapplied developed DCs on firm performance. This research would explore the types of DCs, how are they applied to the operations of the firm, what their impact on performance is when misapplied, and how the misapplication is managed. The study might also develop procedures and rules for applying DCs to achieve competitiveness.

Sixth, findings from this study revealed that to develop DCs, firms have to adopt the hybrid of planned and emergent strategies. This contribution provides an interesting avenue for future research on the strategy making process and the development of DCs in firms. This research could investigate and extend the hybrid strategy making process, focusing on what the hybrid strategy is, identifying the necessary factors for making this strategy, the types of strategies that are made, how they are made, how they are implemented, and their impact on the development of DCs and performance of the firms.

Seventh, learning was identified as an intervening mechanism for developing DCs. Before this discovery, there have been various inconsistencies regarding learning and the development of DCs. This discovery offers a fertile ground for future research into how learning acts as intervening mechanism for developing DCs. This research could expand on the present findings, on how learning acts as an intervening mechanism for the development of other capabilities as well.

8.7 CONCLUDING REMARKS

This study has explored the process through which DCs are created at the strategic level. The basis for developing this theory was the lack of a strategic level theory to explain how DCs are developed in the firm to achieve competitiveness. The evidence from the data analysed revealed that the two firms studied develop and renew their DCs to sustain and improve their competitive positions. The findings show that developing
DCs could be both intentional and an emergent process. It is intentional when DCs occur as a result of the purposeful planning of activities to develop DCs, focusing on people, products, operations, and relationship with stakeholders in their business. In contrast, DCs emerge when the firm does not have prior intentions to develop those DCs, but they are developed during the operations and relationship with stakeholders of the firm through opportunity taking and learning.

Due to the paucity of empirical literature on the theory of developing DCs in the strategic management domain, this researcher adopted a GTM, specifically the Strauss and Corbin approach. The strengths of the GTM for conducting research were that the GTM: (1) provided a systematic step-by-step analytic approach to the study, (2) it incorporated a self-correcting factor for the data collection process, (3) it assisted with the development of a theory rather than contextual descriptions of the phenomenon of creating DCs, and (4) its emphasis on comparative methods enhanced the theory development and verification process (Denzin and Lincoln, 2002). As a result of the methodology adopted, the researcher was able to identify the various specific components and features of the process of creating DCs. The experience of using the GTM approach provided a systematic and analytic approach through which data were collected and analysed, which led to the development of a substantive theory.

The study has two main findings. Firstly, the identification and explanations of the process through which DCs are created at the strategic level in the two participating firms. Secondly, a model of the process of creating DCs was developed. The substantive theory developed depicts the experience of the two firms using internal and external developmental approaches, with activities such as in-house innovation, HRAs, collaboration, acquisitions, and learning, in a clearly outlined iterative and simultaneous process, to create DCs at the strategic level.

This study contributes to knowledge on the process of creating DCs. Although the study is limited to two firms, it represents a starting point for large-scale examination of the process of creating DCs in multiple firms and a substantive theory to serve as a basis for generating a formal theory on DCs. This theory developed has wider implications for managers operating in dynamic environments. To operate in these environments, firms have to be agile and flexible to adapt to changing business environment. This theory therefore provides a basis for understanding how the everyday activities in the business
relate to the process of developing and renewing DCs, which can help firms to achieve and sustain competitiveness. Organisational theorists, strategists and practitioners can use the model to explore, where appropriate, how they can develop DCs. Researchers can also use the model for future research to test the findings on a wider scale and to develop a formal theory on the concept of DC.
REFERENCES


Winter (eds.) *The nature and dynamics of organizational capabilities* (pp. 244-280). New York: Oxford University Press.


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Simons, R. H. & Royer, S. (2006). Building bridges to successful alliance formation: extending our understanding of performance related determinants focusing on small-


Appendix A  Letter for Negotiating Access

.................................
.................................
.................................

30th June 2004

Dear ............

RESEARCH

I am a Doctoral student at Loughborough University Business School, conducting a study into the process of creating dynamic capabilities in organisations. The aim of the research is to understand the process of developing and using dynamic capabilities in successful organisations. The study will make an important contribution to the development of theory and a framework for creating dynamic capability, which will illustrate and explain the different activities used by the participating companies.

At this stage of my research, I need access to a number of companies to explore how dynamic capabilities are actually being developed. Your company ................. has been identified as one of the most successful, which displays characteristics of highly dynamic operations, and has sustained competitiveness over the years; hence, it perfectly matches the aim of my research. Your views as a practitioner will be an invaluable source of information to support the study. The research will involve mainly interviews with top, senior, middle and lower level management teams in your company. Each interview will last approximately 30 minutes.

During the course of this study, you will be informed of any significant new findings, and your consent to continue the study in the light of the new findings will be obtained. The decision of keeping documents and records confidential will rest on you and how you want the data to be disseminated.

I therefore hope that you are able to support the research. Thank you for your cooperation.

Yours sincerely

................................. .................................
Appendix B1 Research Brief to Participants

Research Brief on the Process of Creating DCs

I am a Doctoral research student at Loughborough University Business School conducting a study into the process of creating dynamic capabilities in UK-based organisations.

My research project aims to identify, describe and explain the strategic level process through which companies develop dynamic capabilities. The intention is to identify how the key capabilities of your company have been developed to compete in the changing market. The important issue for my study is to find out the process through which these dynamic capabilities were developed or are being developed over a period of time. The key issues to be explored include: How did you adapt to changes in your business environment over time? What are the key capabilities of your organisation? What is the process through which the capabilities are developed?

The research will involve mainly interviews with top, senior, middle and lower level management teams, as well project management teams in your company, over a period of time. Each interview will last approximately 30 minutes. On the issue of confidentiality, the Company will take the decision whether to be anonymous or not. The researcher will present the company with summary results on the findings of the research.

I therefore hope that you are able to support the research.
Appendix B 2 Capabilities Definition

Capabilities refer to the key role of management in appropriately adapting, integrating and reconfiguring internal and external organisational skills, resources, and functional competences to match the requirements of a changing environment or competition. A capability therefore refers to the quality of being able physically or intellectually to perform a task and the capacity for a set of resources to collectively perform a stretch task or an activity. Through continued use, capabilities become stronger and more difficult for competitors to understand and imitate. As a source of competitiveness, a capability "should be neither so simple that it is highly imitable, nor so complex that it defies internal steering and control".

In an organisation, capabilities may be found on the shop floor, in R&D operations, and in managerial activities. Three levels of capabilities can be identified in organisations: static, improvement and evolutionary capabilities.

Static capability refers to a firm’s level of performance and it is static in its basic nature. Improvement capability, in contrast, deals with the pace of performance improvements and thus causes changes in competitive performance.

Evolutionary capability enables the accumulation and change of capabilities themselves, and it is a highly dynamic capability that cannot be easily identified as an organisational routine with a repetitive nature. The focus of this interview is on improvement and evolutionary capabilities.

Ms. Cynthia Akwei
Loughborough University
Business School
LE11 3TU Loughborough
E-mail: C.A.Akwei@lboro.ac.uk
Tel. 01509260407/01509223239
Mobile: 07950461868
### Appendix C  Interview Participants

<table>
<thead>
<tr>
<th>Name /Job titles of Respondents</th>
<th>Company</th>
<th>Date /Time interview</th>
<th>Method</th>
<th>Areas Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. David Clarke</td>
<td>Rolls Royce Derby</td>
<td>27th August 2004, 1:30-2:15pm</td>
<td>Face-to-face interview</td>
<td>General, DCs creation</td>
</tr>
<tr>
<td>Head of Technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Phil Branton</td>
<td>Sage Newcastle</td>
<td>14th December 2004, 1:00-2:50 pm</td>
<td>Face-to-face interview</td>
<td>General, DCs Creation</td>
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<tr>
<td>Director of Investor Relations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sharon Taylor</td>
<td>Sage Newcastle</td>
<td>14th December 2004, 2:45-3:15pm</td>
<td>Face-to-face interview</td>
<td>General, Strategies, Collaboration</td>
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<tr>
<td>Sales Manageress</td>
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<tr>
<td>Dr. Simon Weeks</td>
<td>Rolls Royce Derby</td>
<td>11th January 2005, 9:10-10:20 am</td>
<td>Face-to-face interview</td>
<td>General, Strategies, Reasons</td>
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<tr>
<td>Head of Strategic Research</td>
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<tr>
<td>Dr. Bradley Payne</td>
<td>Rolls Royce Derby</td>
<td>11th January 2005, 10:35-11:10 am</td>
<td>Face-to-face interview</td>
<td>Collaboration- UTPS, General</td>
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<td>Universities Liaison Recruitment Officer</td>
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<tr>
<td>Noel Saunders</td>
<td>Rolls Royce Derby</td>
<td>11th January 2005, 11:15-12:00 am</td>
<td>Face-to-face interview</td>
<td>Innovation, General</td>
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<td>Performance Monitoring Officer</td>
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<td></td>
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<td>Robert Nutthall</td>
<td>Rolls Royce Derby</td>
<td>12th January 2005, 1:30-2:30pm</td>
<td>Face-to-face interview</td>
<td>General, Collaboration</td>
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<td>Vice-President Marketing</td>
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<td>Alistair Leadbeat</td>
<td>Sage Newcastle</td>
<td>13th January 2005, 3:00-4:00pm</td>
<td>Telephone interview</td>
<td>R&amp;D and New product development, General</td>
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<tr>
<td>Product Development Manager</td>
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<tr>
<td>Carl Bourne</td>
<td>Rolls Royce Derby</td>
<td>19th January 2005, 11:20-12:15pm</td>
<td>Face-to-face interview</td>
<td>Strategic decision-making, Acquisition, Planned/ emergent strategies, General</td>
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<td>Corporate Development Manager</td>
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<td>Mark Francis</td>
<td>Sage Newcastle</td>
<td>25th February 2005, 1:15pm-2:00pm</td>
<td>Face-to-face interview</td>
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<td>Product Manager</td>
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<td>Ian Tufts</td>
<td>Sage Newcastle</td>
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<td>Face-to-face interview</td>
<td>Innovation, Collaboration, General</td>
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<td>MMS Programme Manager</td>
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<td>Andrew Blair</td>
<td>Sage Newcastle</td>
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<td>Face-to-face interview</td>
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<td>Technical Support Manager</td>
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<td>Jerry Godwin</td>
<td>Rolls Royce Derby</td>
<td>1st March 2005, 8:55am-9:40am</td>
<td>Face-to-face interview</td>
<td>R&amp;D and R&amp;T and New product development, General</td>
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<tr>
<td>Chief of APSD Civil &amp; APSD Team</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Dr. Mark Taylor</td>
<td>Rolls Royce Derby</td>
<td>1st March 2005, 9:55am-10:40am</td>
<td>Face-to-face interview</td>
<td>General, HRAs, Innovation, Learning</td>
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<tr>
<td>Senior Project Engineer APSD</td>
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<td>Brian Simmers</td>
<td>Rolls Royce Derby</td>
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<td>Matthew Forrest</td>
<td>Sage Newcastle</td>
<td>11th March 2005, 9:00am-9:50am</td>
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<td>Mergers and Acquisitions Manager</td>
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329
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<tr>
<th>Name /Job titles of Respondents</th>
<th>Company</th>
<th>Date /Time interview</th>
<th>Method</th>
<th>Areas Covered</th>
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<tr>
<td>David Knotts</td>
<td>Rolls Royce Derby</td>
<td>14th March 2005 2:30pm - 3:30pm</td>
<td>Face-to-face interview</td>
<td>Project design /management, Collaboration, Acquisitions, General</td>
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<td>Mike Whittingham Employee</td>
<td>Rolls Royce Derby</td>
<td>15th March 2005 9:45am - 10:40am</td>
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<td>Sharon Platt</td>
<td>Sage Newcastle</td>
<td>12th April 2005 10:00am -10: 35 am</td>
<td>Telephone interview</td>
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<td>Patrick Kniveton Head of Business Management</td>
<td>Rolls Royce Derby</td>
<td>19th April 2005 1:10 pm - 2:00pm</td>
<td>Face-to-face interview</td>
<td>Process of creating DCs, HRAs, Acquisitions, Collaboration and JVs</td>
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<td>Mike Goulette Director Technology/Operations</td>
<td>Rolls Royce Derby</td>
<td>3rd May 2005 10:30 - 11:30am</td>
<td>Face-to-face interview</td>
<td>General DC development processes, JVs and Acquisitions, Leadership</td>
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<td>Dr. Henri Winand Vice-President Corporate Venturing</td>
<td>Rolls Royce Derby</td>
<td>3rd May 2005 12:00 - 1:30pm</td>
<td>Face-to-face interview</td>
<td>General DCs development, Learning, Corporate venturing</td>
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<td>Andrew Clayson Director of Product Management</td>
<td>Sage Newcastle</td>
<td>16th June 2005 2:00pm-2:50pm</td>
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<td>Sarah Kaye Director of Human Resource</td>
<td>Sage Newcastle</td>
<td>19th June 2005 2:35pm - 3:15pm</td>
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<td>Nicole Hewitt De Vega Business Development Manager Marketing</td>
<td>Sage Newcastle</td>
<td>19th June 2005 3:20pm - 4:10pm</td>
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<td>John Patterson Business Development Manager – Payroll</td>
<td>Sage Newcastle</td>
<td>19th June 2005 4:15 pm - 5:05 pm</td>
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<td>Allison Wickham Business Development Manager – Technical Support</td>
<td>Sage Newcastle</td>
<td>19th June 2005 5:15pm - 6:05 pm</td>
<td>Face-to-face interview</td>
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Appendix D Secondary Data Sources


## Appendix E  Major Acquisitions, Sage

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<thead>
<tr>
<th>Date</th>
<th>Company</th>
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<td>UK</td>
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<td>US</td>
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<td>Healthcare Vertical</td>
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<td>France</td>
<td>£*</td>
<td>Transport and food distribution vertical</td>
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<td>France</td>
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<td>Cogestib</td>
<td>France</td>
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<td>Distribution Vertical</td>
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<td>2005</td>
<td>Logic Control</td>
<td>Spain</td>
<td>£54.7m</td>
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<td>Symfonia</td>
<td>Poland</td>
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<td>2005</td>
<td>Simultan</td>
<td>Switzerland</td>
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<td>FLS</td>
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<td>ACCPAC</td>
<td>US</td>
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<td>Softline</td>
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<td>Not-for-profit Vertical</td>
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<td>Sesam</td>
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<td>Tetra</td>
<td>UK</td>
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<td>KHK</td>
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<td>Sybel</td>
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<td>France</td>
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<td>Ciel</td>
<td>France</td>
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<td>DacEasy</td>
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